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RESONANT PERTURBATION OF EARTH SATELLITES IN 2 DAY COMMENSURABLE ORBITS

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ABSTRACT

Until very recently the only satellite orbits which have been found to resonate with longitude terms in the geopotential have been those which are commensurable with the earth's rotation in about one day. Recently, resonant effects have been observed on orbits whose ground tracks repeat only in about 2 days. Examination of satellite orbits with commensurable periods near integer multiples of one day offers the only possibility of observing the strong dominant resonance effects of most of the longitude gravity harmonics (H_{ℓ_m}) of order (m) higher than 16. A survey of existing satellite elements in June 1968 has revealed two 2 day commensurable orbits, one of 13.5 and the other of 14.5 revolutions a day, which show resonant perturbations greater than 100 km along track due to $H_{27,27}$ and $H_{38,29}$ respectively. Twelve other satellites in orbits of 8.5, 9.5, 10.5, 12.5, 13.5 and 14.5 revs./day should be suffering resonant perturbations greater than 1 km along track. The dominant resonant gravity harmonics on these orbits are: $H_{19,17}$, (8.5 revs./day, 1 orbit), $H_{19,19}$ (9.5 revs./day, 2 orbits), $H_{21,21}$ (10.5 revs./day, 1 orbit) $H_{25,25}$, $H_{26,25}$ and $H_{28,25}$ (12.5 revs./day, 3 orbits), and $H_{30,29}$ (14.5 revs./day, 2 orbits). Close tracking of these objects over their resonant beat periods which range from 13 to hundreds of days should yield valuable new information about the earth's high order gravity field.

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INTRODUCTION

Both the theory and the application of resonant satellite geodesy has made considerable progress since Y. V. Batrakov introduced the basic ideas of the method at the 14th International Astronautical Federation Congress in 1963.[1] The principal idea is that the non-zonal or longitude terms in the gravity geopotential should be determined from observations of their amplified secular or long period effects paralleling the way the zonal terms are determined. The only orbits which show amplified long period effects (principally in the semi-major axis) from non-zonal geopotential terms are the so-called resonant orbits whose periods are commensurable with the earth's rotation period.

Since 1965, studies of both high and low altitude satellites in or near resonant orbits with about one day commensurability have contributed significantly to the determination of longitude dependent geopotential constants of order 2, 3, 4, 9, 11, 12, 13, 14 and 15. However, the discrimination of geopotential effects in the resonant solutions which have been published is still quite weak in general because of the limited distribution of orbits used. A recent study[2] has shown that a great many poorly tracked satellites with widely different elements exist in near one day resonant orbits which will show significant geodetic perturbations. Use of many of these new objects for satellite geodesy should greatly improve the absolute determination of a large number of high and low order geopotential terms.

Another approach is to look for resonant orbits of higher order commensurabilities. These are the orbits with repeating ground tracks only in about n' sidereal days where $n' = 2, 3, 4, \ldots$ The use of such orbits can provide new information on constants of order less than 16 which generally resonate (in drag free orbits) more strongly at one day commensurabilities. But perhaps more important, they provide unique access to the resonant effects of most of the constants of order greater than 16.

For example, the resonant effects of odd order constants greater than $m = 15$ cannot be observed on one day commensurable orbits because the lowest such orbit has a mean motion of about 16 revolutions a day. But the odd order constants from $m = 17$ to $m = 31$ will generally dominate the resonance regimes for the two

day resonant orbits of from 8-1/2 to 15-1/2 revolutions a day. The higher order commensurable orbits can thus bring out the effects of high order anomalies which would otherwise be very difficult to detect on a drag free non-resonant satellite. Of course, the distance damping of the potential will reduce the size of these high order resonance effects compared to the dominant effects for one day commensurable orbits.

A final point of definition should be emphasized: the two day resonant orbits (as I define them) are entirely exclusive of the orbits of single day commensurability. The two day resonant orbits make only an odd number of revolutions in about two sidereal days (see Table 1). This point is made because Anderle and Smith[3] have recently measured the effects of high degree and order constants on orbits for which $mT \sim 2$, where T is the orbit period in sidereal days. But this classification gives unique two day commensurable orbits only when m is odd. When m is even, the orbit is actually commensurable in one day. On these latter orbits, the effects of the high order constants should be called overtones of the dominant effect whose wave length is twice as long, (or whose frequency or order, m, is half as much) as the overtone frequency. The effects of such resonant overtones have also been measured recently on two high altitude Russian communications satellites[4,5] of 12 hour period (orbital frequency of 2 revolutions a day).

While such resonant overtones of high order effects can be distinguished from the dominant frequency by harmonic analysis, on higher order commensurable orbits these overtones become the dominant effect. For example, for the overtone harmonic $H_{28,28}$ observed by Anderle and Smith[3] on a 14 revolutions a day orbit, the harmonics of order 14 are dominant. But on an orbit of 28/3 = 9-1/3 revs./day, the 28th order harmonics would have dominant effects. However, they would not necessarily be better observed because the 9-1/3 revs./day orbit is at a greater altitude than that at 14 revs./day and suffers to a greater degree from the potential's distance damping.

The observations of 27th order coefficients by Anderle and Smith (1968)[3] represent the first successful geodetic use of true (i.e. unique) 2 day resonant orbits. This use (with the Navy's "Transit" navigation satellite system) was forecast in a paper by Oesterwinter (1965).[6] Gabbard (1966)[7] tried (unsuccessfully) to observe the resonant effects of coefficients of 31st and 33rd order on 3 low altitude satellites strongly effected by drag. With these satellites the periods for the 33rd order effects were all less than one day. Technically, only the amplified effects of the 31st order coefficients (with theoretical periods greater than one day) should be considered as off resonant phenomenon with respect to the 2 day commensurate orbit of 15-1/2 revolutions per day.

In the present study I have made an exhaustive search of satellite elements as of June 1968,[8] to find those orbits near 2 day commensurabilities which show significant high order geopotential resonant perturbations.

ANALYSIS

The unique commensurable or resonant orbits of two days will have a ground track that roughly repeats after an odd number of revolutions, r', in 2 sidereal days. The period will thus be given approximately by

$$P = \frac{2 \times 1436 \text{ (min./sid. day)}}{r'} \text{ , minutes}$$

(see Table 1).

From previous analysis,[4,9] approximate ground track repetition assures resonance with geopotential terms (ℓ, m, p, q) satisfying:

$$\ell - 2p + q = m/s, \tag{1}$$

where s is a rational fraction (the approximate orbital frequency in revolutions/sidereal day) and m/s is an integer. The indices ℓ, m, p, q refer to the potential of Kaula in the coordinates of Keplerian elements:[10]

$$V = \frac{\mu}{r} + R_{\ell m}, \text{ where}$$

$$R_{\ell m} = \frac{\mu a_e^{\ell}}{a^{\ell+1}} J_{\ell m} \sum_{p=0}^{\ell} F_{\ell mp}(I) \cdot \sum_{q=-\infty}^{\infty} G_{\ell pq}(e). \tag{2}$$

$$\begin{Bmatrix} \cos \\ \\ \\ \sin \end{Bmatrix}^{\ell - m \text{ even}}_{\ell - m \text{ odd}} [(\ell - 2p)\omega + (\ell - 2p + q)M + m(\Omega - \theta - \lambda_{\ell m})],$$

where a, e, I, w and M are the usual Kepler elements, θ is the Greenwich hour angle at epoch, μ is the Gaussian gravity constant (GM), a_e is the mean equatorial radius of the earth, and J_{ℓ_m} and λ_{ℓ_m} are the unnormalized amplitudes and phase angles of the spherical gravity harmonics H_{ℓ_m}. The F and G functions are defined in Kaula's text.[10]

For the two day resonances, $s = r'/2$, where r' is odd. Thus, $m/s = 2m/r' = 2, 4, \ldots$. defines the harmonic orders (m) resonant on the two day commensurable orbit. Since $\ell \geq m$ and the harmonic effects fall off with increasing degree (ℓ) the dominant effects on a given orbit will probably be due to those of the lowest possible ℓ,m combination. The lowest resonant orders (m) for these orbits are listed in Table 1. The very lowest order m for a given r' is found from $m/s = 2m/r' = 2$. Thus, for the two day commensurable orbits, the probably dominant resonant harmonic terms satisfy:

$$\ell - 2p + q = 2 \tag{3}$$

Dominant Resonant Terms for Circular Orbits

Since $G_{\ell_{pq}}(e) = 0(e^{|q|})$, for $e = 0$, only the $q = 0$ terms will be active. Thus, for circular orbits, ℓ must be even, since for this case (3) reduces to:

$$\ell = 2 + 2p.$$

Evidently, then, the dominant term on the circular 2 day commensurable orbit of frequency r' (odd) revs./day is given by indices:

$$m = r'$$

$$\ell = m + 1 = r' + 1$$

$$p = (\ell - 2)/2 = (r' - 1)/2$$

$$q = 0,$$

excluding the $r' = 1$ case. (See Table 1).

Dominant Resonant Terms for Eccentric Orbits

For significantly eccentric orbit cases (possible with periods $\dot{>}$ 100 minutes), $q \neq 0$ terms can give dominant perturbations and $\ell = m = r'$ (odd) may be the dominant harmonic. In these cases, (3) reduces to:

$$q = 2 - r' + 2p,$$

so that the lowest (presumably strongest) non-zero q terms are given by:

$$q = 1 \quad (r' = 1,\ p = 0)$$

$$q = \pm 1 \quad \left[r' \neq 1,\ p = \begin{matrix} (r' - 1)/2 \\ \\ (r' - 3)/2 \end{matrix} \right]$$

Excluding the $r' = 1$ case, the probably dominant ($q \neq 0$) resonant terms are:

$$m = r'$$

$$\ell = m = r'$$

$$p = (r' - 1)/2,\ (r' - 3)/2$$

$$q = +1,\ -1$$

(See Table 1.)

The Case $r' = 1$ (2 Day Orbit)

Here the $m/s = 2$ specification gives resonances with all $m = 1$ terms, the leading one of which will be H_{31} since $H_{11} = H_{21} = 0$ in the properly defined geopotential. The probably dominant $q \neq 0$ terms associated with this harmonic (for the eccentric orbit case) are, from (3):

$$(\ell, m, p, q) = (3, 1, 0, -1),\ (3, 1, 1, 1)$$

(See Table 1.) However, the $m = 2$ terms on the two day satellite are possibly strong overtone frequencies associated with $m/s = 4$. They may be dominant on an eccentric orbit since the lowest active degrees in this series are $\ell = 2$ and 3. Satisfying (1) for $r' = 1$, $m = 2$, $m/s = 4$, gives:

$$\ell = 4 + 2p - q. \tag{4}$$

Thus we see that while the lowest degree $q = 0$ resonant harmonic for the 2 day orbit is H_{41} for $m = 1$, $m/s = 2$; the lowest degree $q = 0$ resonant harmonic is H_{42} for the first overtone series ($m = 2$, $m/s = 4$). From (4) we see that the lowest q resonant $\ell = 2$ and 3 terms on the 2 day orbit are:

$$(2, 2, 0, 2) \text{ and } (3, 2, 0, 1).$$

For the eccentric 2 day orbit any of the above harmonic terms of H_{22}, H_{31} and H_{32} may be dominant.

For the circular orbit, from (3), the dominant fundamental frequency ($m = 1$) $q = 0$ term is:

$$(4, 1, 1, 0).$$

From (4), the dominant overtone frequency ($m = 2$) $q = 0$ term is:

$$(4, 2, 0, 0).$$

For the circular two day orbit any of the above 4th degree terms may be dominant. (See Table 1.)

2 Day Resonant Orbit Periods

Exact one day resonant orbit periods (with respect to the mean longitude of the satellite, i.e.; orbit periods giving zero drift of the mean longitude) may be

found[11] by iterating the following zero drift rate equation (incorporating first order secular effects due to the earth's oblateness) for $\bar{n}$ (the "mean" mean motion):

$$0 = 360\,\bar{n}\left\{-\frac{1.0827\times10^{-3}}{[\bar{a}(1-e^2)]^2}\left[\frac{3(1/s)\,(1-5\cos^2 I)}{4}+\frac{3\cos I}{2}\right]+\frac{1}{s}\right\}-360\cdot9853, \qquad (5)$$

where $\bar{n}$ is in revs./day and $\bar{a}$ is in earth radii.

The two day resonances r' (revs./2 days) can be specified by setting $s = r'/2$ in equation (5). The "mean" mean motion $\bar{n}$ and the mean semi-major axis $\bar{a}$ are related by Kozai's formula:[12]

$$\bar{a}^3\bar{n}^2 = \mu\left[1+\frac{3J_{20}(a_e/a)^2}{4(1-e^2)^{3/2}}(3\cos^2 I-1)\right], \qquad (6)$$

where

$$J_{20} = -1.0827\times10^{-3} \text{ and}$$

$$\mu = 290\cdot483 \text{ e.r.}^3 \text{ (rev./day)}^2.$$

A good starting value for $\bar{a}$ is:

$$\bar{a}_0 = (290\cdot483)^{1/3}\,(\bar{n}_0)^{-2/3}, \text{ where}$$

$$\bar{n}_0 = \left(\frac{1440}{1436}\right)s = 0.50139\,r'.$$

The synchronous "mean" mean motion defined by equations (5) and (6) will probably be sufficiently accurate for all reasonably close earth satellites ($a \lesssim 3$ e.r.), relatively unaffected by the sun and moon. It is noted that equation (5) is relatively insensitive to small changes in $\bar{a}$. Equation (6), which can be said to define $\bar{a}$ from $\bar{n}$ is actually not a proper definition for a time averaged semi-major axis.[13] But it does conform to the definition used for the elements in the satellite situation reports of NASA and NORAD.[14] Therefore, $\bar{n}$ (synchronous)

will not be materially affected by using in (5) the "Kozai" $\bar{a}$ from (6), instead of a slightly different true time averaged "a." But time averaged synchronous $\bar{a}$'s may be somewhat different from synchronous Kozai $\bar{a}$'s defined from (6).

In Table 2 are listed synchronous "mean" mean motions (taking account only of earth oblateness in $\dot{\omega}$ and $\dot{\Omega}$) and mean semimajor axes (Kozai) derived from (5) and (6) for all one and two day commensurable orbits from $s = 16$ to 0.5 revs./day. Also listed in Table 2 is the mean period P, defined from $\bar{n}$ as it is in the NORAD and NASA element bulletins:

$$P = \frac{1440}{\bar{n}} \text{ minutes.}$$

P is, effectively, a mean anomalistic period.

Beat Periods

Here we will be discussing only the resonant beat period of the mean longitude with respect to the probably dominant harmonic. If n' is the synodic or commensurate period of the orbit in integer days, then the dominant or fundamental resonant harmonic frequency, or order, will be given by:

$$m/s = n', \text{ or}$$

$$m = n's.$$

If the ground track, or mean longitude drifts at $\Delta\dot{\lambda}$ deg./day, then the period the track takes to traverse one wavelength of the resonant longitude harmonic of order $m = n's$, is:

$$BP = \frac{360}{\Delta\dot{\lambda}\, n's} \text{ days.}$$

But $\Delta\dot{\lambda}$ is given from (5), neglecting the oblateness effects, as:

$$\Delta\dot{\lambda} = \frac{360\,\Delta\bar{n}}{s},$$

(See also reference 11). In terms of the mean period, and its distance ΔP, from exact resonance,

$$\Delta n = -\frac{1440}{P^2}\Delta P, \text{ or}$$

$$BP = -\frac{P^2}{n'(1440)\Delta P}.$$

But since P (synchronous) $\doteq \frac{1436}{s}$ minutes,

$$BP = -\frac{1432}{n' s^2 \Delta P}, \text{ Days.} \qquad (7)$$

A graph of this dominant "ground track" resonant beat period as a function of period distance from exact commensurability is given in Figure 1. In figure 2, semimajor axis distance is related to period distance from exact resonance.

It is noted that for a given beat period, the orbit must be closer to exact commensurability in proportion to n' for the multiple day resonances. Taking account of beat period alone, since there are about the same number of two day as one day resonant orbits between any two finite altitudes, on a random basis there will be half as many two day as one day commensurate orbits showing significant resonant perturbations.

Perturbation Scaling Factors for Multiple Day Commensurabilities

The proportion of significant multiple day resonant orbits is further reduced by the distance damping of the anomalous geopotential together with a natural decline in geopotential constants.

We recall[2,15] that the maximum acceleration of the mean anomaly, M, due only to a particular resonant harmonic term (ℓ, m, p, q) is given at exact resonance by:

$$\ddot{M} = -\frac{3m}{s}\,\mu\,\frac{a_e^{\ell}}{a^{\ell+3}}\,J_{\ell m}\,F_{\ell m p}\,G_{\ell p q}.$$

Since the fundamental resonant order is given by $m/s = n'$, and $a^3 s^2 \sim \mu$, the acceleration above can be written as:

$$\ddot{M} \doteq -3n'\,s^2\,a^{-\ell}\,JFG, \text{ or}$$

$$\ddot{M} \doteq -3n'\,\mu^{-\ell/3}\,s^{2(1+\ell/3)}\,JFG,$$

where s is in units of revs./day and a in units of earth radii. The normalized geopotential constants $\bar{J}_{\ell m}$ are believed[10] to decline according to the approximate law

$$\bar{J}_{\ell m} = \frac{\sqrt{2}}{\ell^2}$$

through quite high degree (ℓ), where:

$$J_{\ell m} = \bar{J}_{\ell m}\left[\frac{2(2\ell+1)\,(\ell-m)!}{(\ell+m)!}\right]^{1/2},\quad m \neq 0.$$

The normalization factor above is effectively cancelled by the factor of the inclination function $F_{\ell mp}(I)$. Assuming this normalized inclination function times $G(e)$ to be relatively insensitive (on average) to ℓ as long as $\ell \sim m$ (regardless of p and q), $\ddot{M}$ can be written as a function only of n', s and ℓ:

$$\ddot{M} \propto \frac{n'}{\ell^2}\,\mu^{-\ell/3}\,s^{2(1+\ell/3)}.$$

But ℓ can be eliminated explicitly by recalling that $\ell \sim m = sn'$ for the probably dominant resonant harmonic. Thus:

$$\ddot{M} \alpha \frac{1}{n'} \mu^{-sn'/3} s^{2sn'/3}. \tag{8}$$

Writing (8) as an amplifying factor for the one day resonance, gives the ratio $\ddot{M}(n' = 1)/\ddot{M}(n') = \text{A.F.}(n')$:

$$\text{A.F.}(n') = n' \mu^{s/3(n'-1)} s^{-2s/3(n'-1)}, \tag{9}$$

where μ is in units of e.r.^{3} $\times$ (revs./day).^{2} Figure 3 is a graph of these amplification factors for $n' = 2$ and 3. It is noted that they are everywhere greater than one as expected and also greater for greater n' commensurabilities. They also show relative maxima with respect to s at about 6 revs./day. If s is treated as a continuous variable, we can establish the relative maxima by setting:

$$\frac{\partial(\text{A.F.})}{\partial s} = 0.$$

After taking the appropriate derivatives of (9), this relative maximum s, is found to satisfy the relation:

$$s = \frac{\mu^{1/2}}{E}, \tag{10}$$

where E is the base of the natural logarithms, 2.718.... Since $\mu \doteq 290.5$ e.r.^{3} (rev./day),^{2}

$$s(\text{max. A.F.}) = 6.27 \text{ revs./day}.$$

In all of this derivation with continuous s it has been tacitly assumed that at any s, or orbital frequency, we can find all kinds of commensurate orbits. Obviously

this is not true, but there is always any kind of commensurability reasonably close to a given orbital frequency to make this rough calculation of amplifying factors meaningful.

2 Day Resonant Orbit Perturbations of Existing Satellites

An exhaustive search was made of the NASA-GSFC Satellite Situation Report of June 30, 1968,[8] to find orbits sufficiently close to two day resonances to warrant further investigation. The synchronous mean longitude criteria implicit in Table 2 was used as the guide for this screening process. Specifically, all orbits were included which promised resonant beat periods of greater than 15 days according to the mean periods listed in the satellite reports when compared with the data in Table 2. The characteristics of these orbits and the objects in them are listed in Table 3. The physical data on the objects are taken from papers by King-Hele, et al.[16]

A complete spectrum of resonant perturbations due to harmonics as high as the 40th degree was then calculated for these orbits by the same formulas as in Douglas and Wagner,[13] which originate ultimately from Kaula's text.[10] The essential point of these formulas is that they assume shallow resonance, or linear perturbations, (in spite of the amplification), with no feedback to the mean motion by the perturbations themselves.

Recalling from equation (2) the trigonometric arguments of the potential terms, their rates may be written as:

$$\dot{\Psi}_{\ell_{mpq}} = (\ell - 2p)\,\dot{\omega} + (\ell - 2p + q)\,\dot{M} + m\,(\dot{\Omega} - \dot{\theta}).$$

Clearly, the period (BP) of an effect due to a particular (ℓ, m, p, q) term will be

$$BP = \frac{360}{\dot{\Psi}}$$

in days, if $\dot{\Psi}$ is in units of degs./day. The resonant indices for the two day commensurable orbits are chosen from $\ell - 2p + q = m/s = 2m/r'$ with m such that $2m/r'$ is an integer. $\dot{\omega}$ and $\dot{\Omega}$ may be calculated with good accuracy for $a < 3$ e.r. from the first order effects of the earth's oblateness. $\dot{\theta}$ is the

earth's rotation rate. $\dot{M}$ is calculated as $\bar{n}$ from $\bar{a}$ using Kozai's formula [Equation (6)] since the elements (in particular "a") in the satellite report[8] are Kozai mean elements. The periods or beat periods of the significant resonant effects on these 2 day commensurable orbits are found in Table 4.

Resonant harmonic perturbations in a non singular central angle quantity $\Delta CA = \Delta\Omega \cos i + \Delta\omega + \Delta M$ have also been computed in (Table 4) by the following formulas[10] which include resonant effects with linear small divisors ($\dot{\Psi}$) in ΔM, $\Delta\Omega$ and $\Delta\omega$ as well as the dominant effects of the quadratic small divisor ($\dot{\Psi}^2$) in the mean anomaly:

$$\Delta\omega_{\ell mpq} = \mu a_e^{\ell} \frac{[(1-e^2)^{1/2} e^{-1} F_{\ell mp} (\partial G_{\ell pq}/\partial e) + -\cot i\,(1-e^2)^{-1/2} (\partial F_{\ell mp}/\partial i) G_{\ell pq}]\,\bar{S}_{\ell mpq}}{n a^{\ell+3} [(\ell-2p)\,\dot{\omega} + (\ell-2p+q)\,\dot{M} + m(\dot{\Omega}-\dot{\theta})]},$$

$$\Delta\Omega_{\ell mpq} = \mu a_e^{\ell} \frac{(\partial F_{\ell mp}/\partial i)\, G_{\ell pq}\, \bar{S}_{\ell mpq}}{n a^{\ell+3} (1-e^2)^{1/2} \sin i\, [(\ell-2p)\,\dot{\omega} + (\ell-2p+q)\,\dot{M} + m(\dot{\Omega}-\dot{\theta})]}$$

$$\Delta M_{\ell mpq} = \mu a_e^{\ell} \frac{[-(1-e^2)\, e^{-1} (\partial G_{\ell pq}/\partial e) + 2(\ell+1)\, G_{\ell pq}]\, F_{\ell pq}\, \bar{S}_{\ell mpq}}{n a^{\ell+3} [(\ell-2\dot{p})\,\dot{\omega} + (\ell-2p+q)\,\dot{M} + m(\dot{\Omega}-\dot{\theta})]} +$$

$$\frac{3\mu a_e^{\ell} F_{\ell mp}\, G_{\ell mp}\, \bar{S}_{\ell mpq}\, (\ell-2p+q)}{a^{\ell+3} [(\ell-2p)\,\dot{\omega} + (\ell-2p+q)\,\dot{M} + m(\dot{\Omega}-\dot{\theta})]^2}.$$

where

$$S_{\ell mpq} = \begin{bmatrix} C_{\ell m} & \ell - m \text{ even} \\ -S_{\ell m} & \ell - m \text{ odd} \end{bmatrix} \cos[(\ell-2p)\,\omega + (\ell-2p+q)\,M + m(\Omega-\theta)]$$

$$+ \begin{bmatrix} S_{\ell m} & \ell - m \text{ even} \\ C_{\ell m} & \ell - m \text{ odd} \end{bmatrix} \sin[(\ell-2p)\,\omega + (\ell-2p+q)\,M + m(\Omega-\theta)].$$

The quantity $\bar{S}_{\ell_{mpq}}$ is the integral of $S_{\ell_{mpq}}$ with respect to its argument, and

$$C_{\ell_m} = J_{\ell_m} \cos m\lambda_{\ell_m}, \quad S_{\ell_m} = J_{\ell_m} \sin m\lambda_{\ell_m}.$$

In Table 4 it is the amplitude or maximum value of ΔCA that is listed as the Central Angle perturbation. A mean along track perturbation (transverse), $a\Delta CA$, is also listed in Table 4. In addition, resonant perturbations of the semimajor axis are computed (in Table 4) from:[10]

$$\Delta a_{\ell_{mpq}} = \mu a_e^{\ell} \frac{2F_{\ell_{mp}} G_{\ell_{pq}} (\ell - 2p + q) S_{\ell_{mpq}}}{na^{\ell+2} [(\ell - 2p)\dot{\omega} + (\ell - 2p + q) M + m(\Omega - \theta)]}.$$

It should be emphasized that the perturbations in Table 4 are only estimates based on the rule of thumb, $10^5 \bar{J}_{\ell_m} = \sqrt{2}/\ell^2$ recommended first by Kaula[10] and confirmed by Anderle and Smith. Actual harmonic amplitudes may vary as much as an order of magnitude or more from this estimate. Only perturbations of greater than 100 meters (though in some cases 500 and 1000 meters) along track, caused by harmonics up to $H_{40,40}$, have been calculated in Table 4.

CALIBRATION

The only other calculation of significant 2 day resonance effects in the literature is in Anderle and Smith's paper.[3] The orbits examined by Anderle and Smith produced resonant beat periods of less than 15 days and thus are not listed in Tables 3 and 4. However, Table 5 shows a comparison of the nominal perturbations calculated by Anderle and Smith on 3, two day resonant orbits of $s = 27/2$ revs./day, and the same perturbations calculated by the formulas in this report. Each orbit is nearly polar and circular. Every effort was made to assure equivalency in the models for these calculations. However, it should be observed that Anderle and Smith's calculations use a constant inclination function appropriate to a strictly polar satellite. Evaluations of Kaula's $F_{\ell_{mp}}(I)$ for these orbits do show a variation of 25% for a 1 degree variation around a polar orbit. It may be that the discrepancy, at worst about 25%, in these comparisons would be removed upon considering this effect on Anderle and Smith's estimates.

RESULTS AND CONCLUSIONS

It is becoming increasingly clear that resonance effects of the geopotential, far from being an isolated phenomenon on a few satellite orbits, are quite common

especially when multiple day commensurabilities are considered. It has been demonstrated here that through the use of existing two day commensurate orbits the first good information on longitude geopotential terms of order 17, 19, 21, 25 and 29 will be forthcoming.

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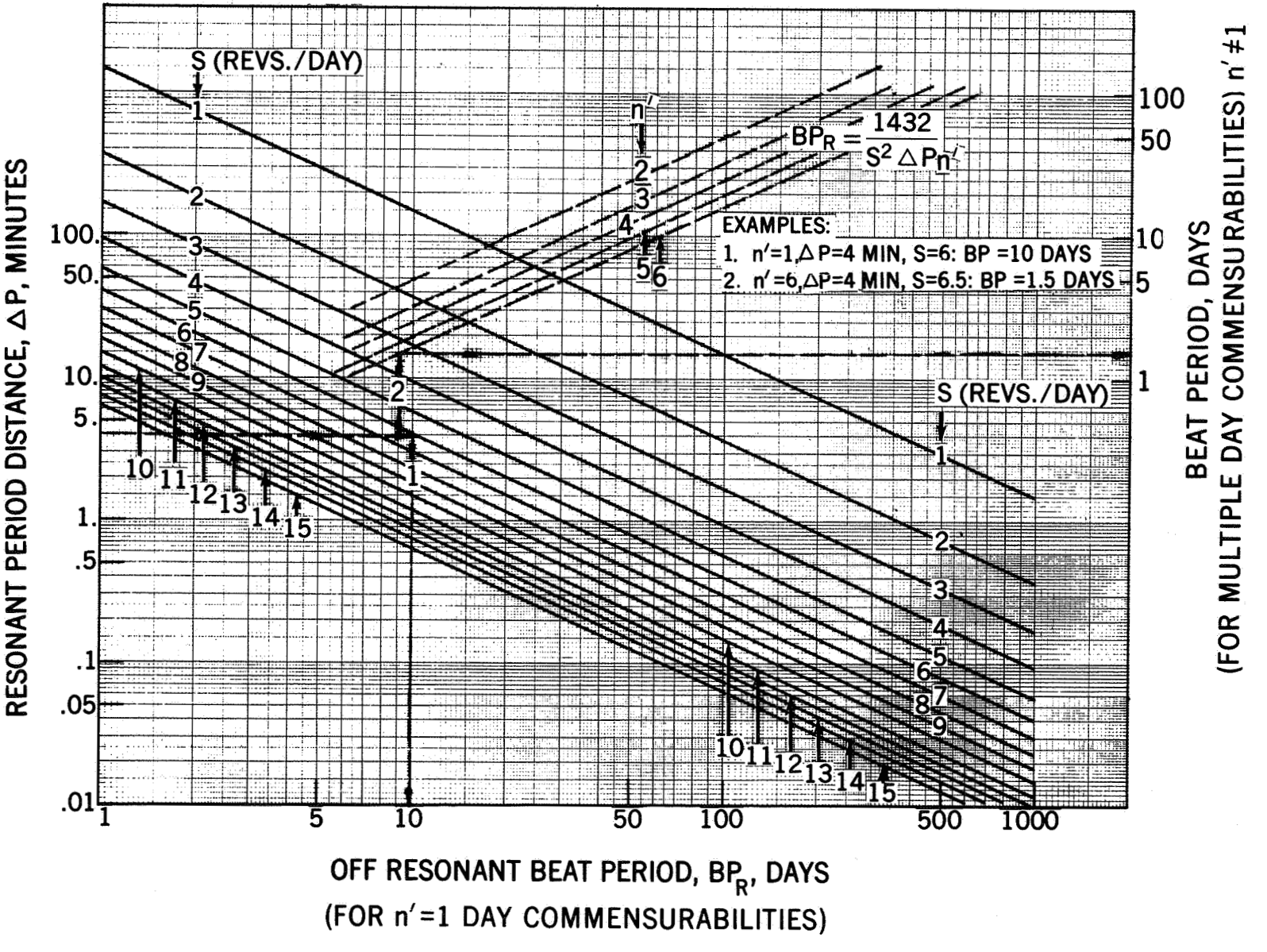

Figure 1–Off Resonant Beat Period as a Function of Period Distance from Resonance for Near Commensurable Earth Satellite Orbits

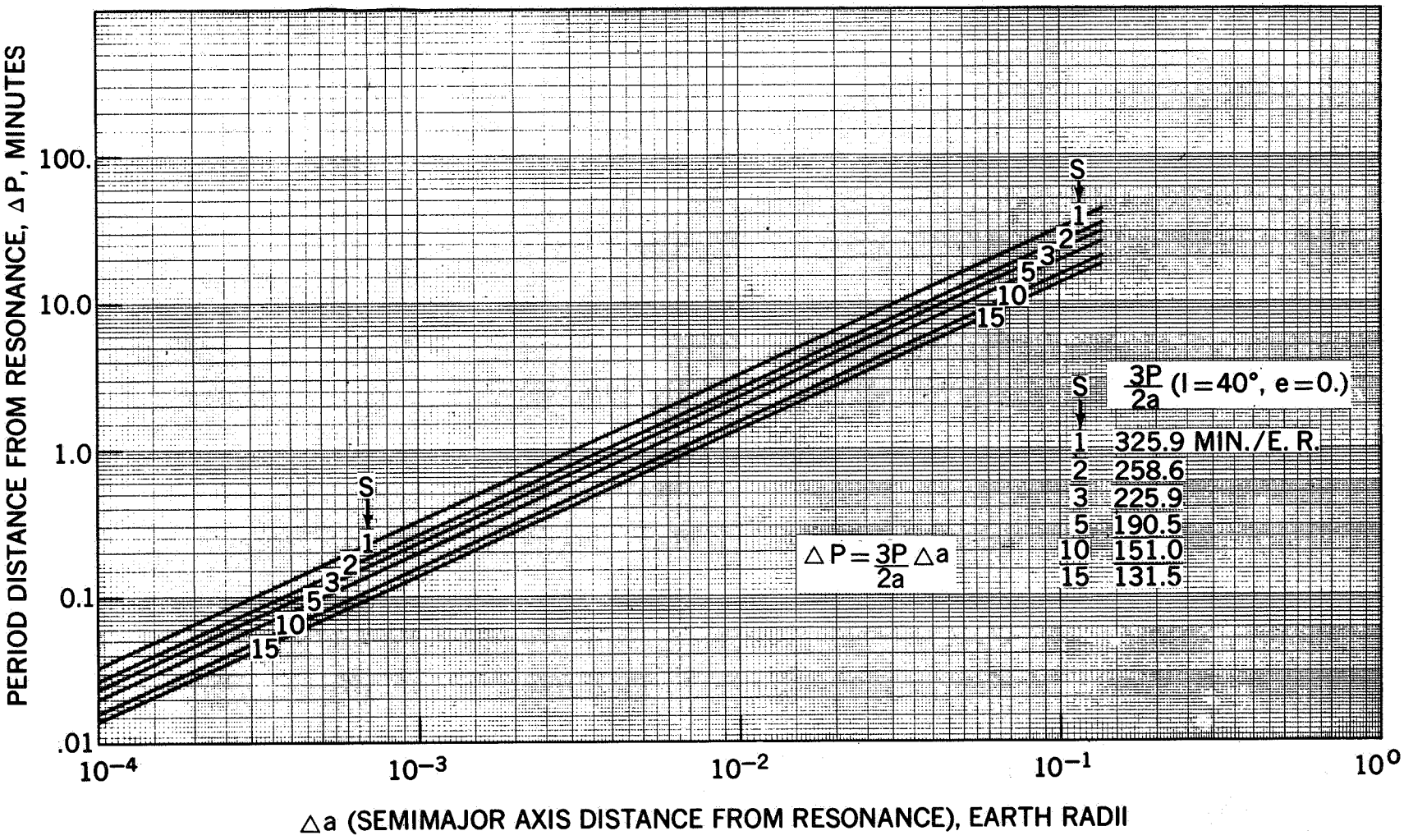

Figure 2–Off Resonant Period Distance as a Function of Semimajor Axis Distance from Resonance

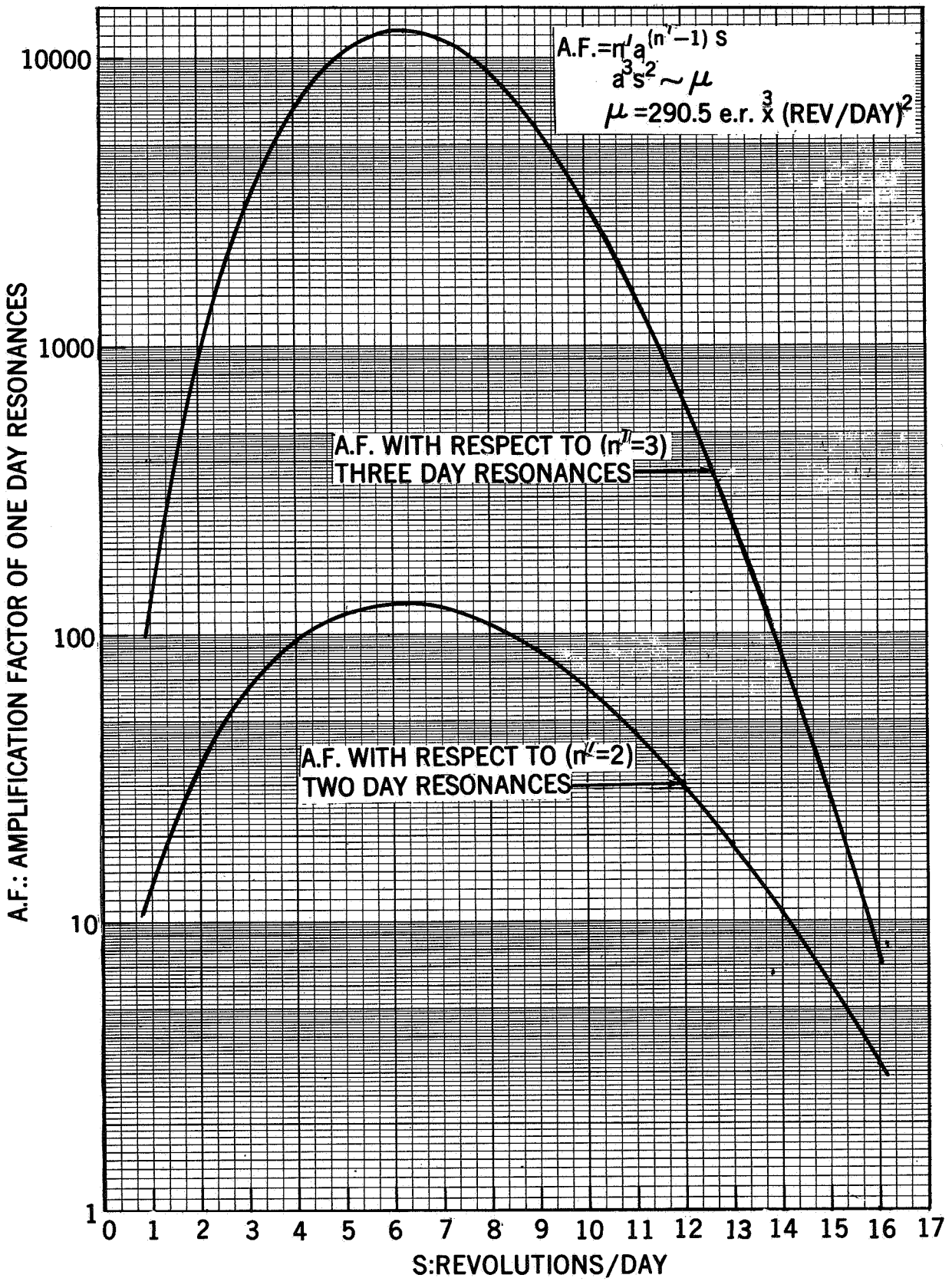

Figure 3–Amplification Factors of One Day With Respect to Multiple Day Resonances

Table 1
2 Day Commensurate Orbits and Resonant Terms

Approximate Period: 1436/s (minutes)	r' (Revs./2 Days)	s (Revs./Day)	(m/s = 2m/r' = 2,4 . . .) m Resonant	Probably Dominant Terms (ℓ, m, p, q)
2872	1	.5	1,2,3, . . .	(2,2,0,2), (3,1,0,-1), (3,2,1,1), (3,2,0,1), (4,1,1,0), (4,2,0,0)
957.3	3	1.5	3,6,9, . . .	(3,3,0,-1), (3,3,1,1), (4,3,1,0)
574.4	5	2.5	5,10,15, . . .	(5,5,1,-1), (5,5,2,1), (6,5,2,0)
410.3	7	3.5	7,14,21, . . .	(7,7,2,-1), (7,7,3,1), (8,7,3,0)
319.1	9	4.5	9,18,27, . . .	(9,9,3,-1), (9,9,4,1), (10,9,4,0)
261.1	11	5.5	11,22, . . .	(11,11,4,-1), (11,11,5,1), (12,11,5,0)
220.9	13	6.5	13,26, . . .	(13,13,5,-1), (13,13,6,1), (14,13,6,0)
191.5	15	7.5	15,30, . . .	(15,15,6,-1), (15,15,7,1), (16,15,7,0)
168.9	17	8.5	17,34, . . .	(17,17,7,-1), (17,17,8,1), (18,17,8,0)
151.2	19	9.5	19, . . .	(19,19,8,-1), (19,19,9,1), (20,19,9,0)
136.8	21	10.5	21, . . .	(21,21,9,-1), (21,21,10,1), (22,21,10,0)
124.9	23	11.5	23, . . .	(23,23,10,-1), (23,23,11,1), (24,23,11,0)
114.9	25	12.5	25, . . .	(25,25,11,-1), (25,25,12,1), (26,25,12,0)
106.4	27	13.5	27, . . .	(27,27,12,-1), (27,27,13,1), (28,27,13,0)
99.0	29	14.5	29, . . .	(29,29,13,-1), (29,29,14,1), (30,29,14,0)
92.6	31	15.5	31, . . .	(31,31,14,-1), (31,31,15,1), (32,31,15,0)
87.0	33	16.5	33, . . .	(33,33,15,-1), (33,33,16,1), (34,33,16,0)

S = 0.5 REVS./DAY

TABLE 2

Mean Element Specifications for Commensurate Orbits*

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	2872.20459	10.49397	0.50136
0.0	0.10000	2872.20605	10.49397	0.50136
0.0	0.20000	2872.20996	10.49398	0.50136
0.0	0.30000	2872.21826	10.49399	0.50135
0.0	0.40000	2872.23047	10.49401	0.50135
0.0	0.50000	2872.25366	10.49406	0.50135
0.0	0.60000	2872.29639	10.49414	0.50134
0.0	0.70000	2872.38525	10.49432	0.50133
0.0	0.80000	2872.63037	10.49482	0.50128
0.0	0.90000	2873.89990	10.49752	0.50106
10.00000	0.0	2872.20190	10.49396	0.50136
10.00000	0.10000	2872.20312	10.49397	0.50136
10.00000	0.20000	2872.20728	10.49397	0.50136
10.00000	0.30000	2872.21411	10.49398	0.50136
10.00000	0.40000	2872.22656	10.49401	0.50135
10.00000	0.50000	2872.24829	10.49405	0.50135
10.00000	0.60000	2872.28955	10.49413	0.50134
10.00000	0.70000	2872.37427	10.49430	0.50133
10.00000	0.80000	2872.60864	10.49477	0.50129
10.00000	0.90000	2873.82056	10.49736	0.50108
20.00000	0.0	2872.19360	10.49395	0.50136
20.00000	0.10000	2872.19507	10.49395	0.50136
20.00000	0.20000	2872.19775	10.49396	0.50136
20.00000	0.30000	2872.20459	10.49397	0.50136
20.00000	0.40000	2872.21558	10.49399	0.50136
20.00000	0.50000	2872.23462	10.49403	0.50135
20.00000	0.60000	2872.26904	10.49409	0.50135
20.00000	0.70000	2872.34302	10.49424	0.50133
20.00000	0.80000	2872.54565	10.49465	0.50130
20.00000	0.90000	2873.59204	10.49688	0.50111
30.00000	0.0	2872.18140	10.49393	0.50136
30.00000	0.10000	2872.18140	10.49393	0.50136
30.00000	0.20000	2872.18408	10.49393	0.50136
30.00000	0.30000	2872.18970	10.49394	0.50136
30.00000	0.40000	2872.19775	10.49396	0.50136
30.00000	0.50000	2872.21143	10.49399	0.50136
30.00000	0.60000	2872.23877	10.49404	0.50135
30.00000	0.70000	2872.29517	10.49415	0.50134
30.00000	0.80000	2872.44849	10.49446	0.50131
30.00000	0.90000	2873.24536	10.49616	0.50118

*Specifications given for synchronism of mean longitude or ground track of the satellite, considering only oblateness effects in $\dot{\omega}$ and $\dot{\Omega}$. $\bar{a}$ (semimajor axis) is defined from $\bar{n}$ by Kozai's[12] formula, equation (6).

S = 0.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
40.00000	0.0	2872.16626	10.49391	0.50136
40.00000	0.10000	2872.16626	10.49391	0.50136
40.00000	0.20000	2872.16772	10.49391	0.50136
40.00000	0.30000	2872.17041	10.49391	0.50136
40.00000	0.40000	2872.17603	10.49392	0.50136
40.00000	0.50000	2872.18555	10.49394	0.50136
40.00000	0.60000	2872.20190	10.49397	0.50136
40.00000	0.70000	2872.23608	10.49404	0.50135
40.00000	0.80000	2872.33203	10.49424	0.50133
40.00000	0.90000	2872.82617	10.49529	0.50125
50.00000	0.0	2872.14990	10.49388	0.50137
50.00000	0.10000	2872.14990	10.49388	0.50137
50.00000	0.20000	2872.15137	10.49388	0.50137
50.00000	0.30000	2872.15137	10.49388	0.50137
50.00000	0.40000	2872.15405	10.49389	0.50137
50.00000	0.50000	2872.15674	10.49389	0.50137
50.00000	0.60000	2872.16235	10.49390	0.50136
50.00000	0.70000	2872.17603	10.49393	0.50136
50.00000	0.80000	2872.20996	10.49400	0.50136
50.00000	0.90000	2872.38940	10.49439	0.50132
60.00000	0.0	2872.13599	10.49386	0.50137
60.00000	0.10000	2872.13599	10.49386	0.50137
60.00000	0.20000	2872.13452	10.49385	0.50137
60.00000	0.30000	2872.13452	10.49385	0.50137
60.00000	0.40000	2872.13330	10.49385	0.50137
60.00000	0.50000	2872.13184	10.49385	0.50137
60.00000	0.60000	2872.12769	10.49384	0.50137
60.00000	0.70000	2872.12085	10.49383	0.50137
60.00000	0.80000	2872.10034	10.49379	0.50138
60.00000	0.90000	2871.99365	10.49358	0.50139
70.00000	0.0	2872.12500	10.49384	0.50137
70.00000	0.10000	2872.12500	10.49384	0.50137
70.00000	0.20000	2872.12378	10.49384	0.50137
70.00000	0.30000	2872.12085	10.49383	0.50137
70.00000	0.40000	2872.11816	10.49383	0.50137
70.00000	0.50000	2872.11279	10.49382	0.50137
70.00000	0.60000	2872.10181	10.49380	0.50137
70.00000	0.70000	2872.08008	10.49376	0.50138
70.00000	0.80000	2872.01685	10.49364	0.50139
70.00000	0.90000	2871.69653	10.49298	0.50145
80.00000	0.0	2872.11963	10.49383	0.50137
80.00000	0.10000	2872.11816	10.49383	0.50137
80.00000	0.20000	2872.11694	10.49383	0.50137
80.00000	0.30000	2872.11401	10.49383	0.50137
80.00000	0.40000	2872.11011	10.49382	0.50137

S = 0.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
80.00000	0.50000	2872.10181	10.49380	0.50137
80.00000	0.60000	2872.08813	10.49378	0.50138
80.00000	0.70000	2872.05811	10.49372	0.50138
80.00000	0.80000	2871.97437	10.49357	0.50140
80.00000	0.90000	2871.54028	10.49268	0.50147
90.00000	0.0	2872.11963	10.49383	0.50137
90.00000	0.10000	2872.11963	10.49383	0.50137
90.00000	0.20000	2872.11816	10.49384	0.50137
90.00000	0.30000	2872.11548	10.49383	0.50137
90.00000	0.40000	2872.11133	10.49383	0.50137
90.00000	0.50000	2872.10327	10.49381	0.50137
90.00000	0.60000	2872.08960	10.49379	0.50138
90.00000	0.70000	2872.05957	10.49373	0.50138
90.00000	0.80000	2871.97729	10.49358	0.50140
90.00000	0.90000	2871.55396	10.49274	0.50147
100.00000	0.0	2872.12646	10.49385	0.50137
100.00000	0.10000	2872.12646	10.49385	0.50137
100.00000	0.20000	2872.12500	10.49385	0.50137
100.00000	0.30000	2872.12378	10.49385	0.50137
100.00000	0.40000	2872.12085	10.49384	0.50137
100.00000	0.50000	2872.11548	10.49383	0.50137
100.00000	0.60000	2872.10596	10.49382	0.50137
100.00000	0.70000	2872.08545	10.49379	0.50138
100.00000	0.80000	2872.03076	10.49370	0.50139
100.00000	0.90000	2871.74438	10.49318	0.50144
110.00000	0.0	2872.13867	10.49387	0.50137
110.00000	0.10000	2872.13867	10.49387	0.50137
110.00000	0.20000	2872.13867	10.49387	0.50137
110.00000	0.30000	2872.13867	10.49387	0.50137
110.00000	0.40000	2872.13867	10.49388	0.50137
110.00000	0.50000	2872.13867	10.49388	0.50137
110.00000	0.60000	2872.13745	10.49388	0.50137
110.00000	0.70000	2872.13452	10.49389	0.50137
110.00000	0.80000	2872.12915	10.49391	0.50137
110.00000	0.90000	2872.09766	10.49396	0.50138
120.00000	0.0	2872.15674	10.49391	0.50137
120.00000	0.10000	2872.15674	10.49391	0.50137
120.00000	0.20000	2872.15820	10.49391	0.50137
120.00000	0.30000	2872.16089	10.49392	0.50136
120.00000	0.40000	2872.16357	10.49393	0.50136
120.00000	0.50000	2872.16919	10.49394	0.50136
120.00000	0.60000	2872.17993	10.49397	0.50136
120.00000	0.70000	2872.20190	10.49403	0.50136
120.00000	0.80000	2872.26343	10.49419	0.50135
120.00000	0.90000	2872.58130	10.49501	0.50129

S = 0.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
130.00000	0.0	2872.17725	10.49394	0.50136
130.00000	0.10000	2872.17725	10.49394	0.50136
130.00000	0.20000	2872.17993	10.49395	0.50136
130.00000	0.30000	2872.18408	10.49396	0.50136
130.00000	0.40000	2872.19238	10.49398	0.50136
130.00000	0.50000	2872.20459	10.49401	0.50136
130.00000	0.60000	2872.22925	10.49407	0.50135
130.00000	0.70000	2872.28003	10.49419	0.50134
130.00000	0.80000	2872.41968	10.49451	0.50132
130.00000	0.90000	2873.14258	10.49623	0.50119
140.00000	0.0	2872.19775	10.49398	0.50136
140.00000	0.10000	2872.19922	10.49399	0.50136
140.00000	0.20000	2872.20312	10.49399	0.50136
140.00000	0.30000	2872.20996	10.49401	0.50136
140.00000	0.40000	2872.22241	10.49404	0.50135
140.00000	0.50000	2872.24292	10.49408	0.50135
140.00000	0.60000	2872.28003	10.49416	0.50134
140.00000	0.70000	2872.36060	10.49434	0.50133
140.00000	0.80000	2872.58276	10.49485	0.50129
140.00000	0.90000	2873.72363	10.49748	0.50109
150.00000	0.0	2872.21680	10.49402	0.50135
150.00000	0.10000	2872.21973	10.49402	0.50135
150.00000	0.20000	2872.22363	10.49403	0.50135
150.00000	0.30000	2872.23340	10.49405	0.50135
150.00000	0.40000	2872.24976	10.49408	0.50135
150.00000	0.50000	2872.27734	10.49415	0.50134
150.00000	0.60000	2872.32788	10.49425	0.50134
150.00000	0.70000	2872.43481	10.49449	0.50132
150.00000	0.80000	2872.73193	10.49515	0.50126
150.00000	0.90000	2874.26025	10.49863	0.50100

S = 1.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	1436.12402	6.61080	1.00270
0.0	0.10000	1436.12524	6.61080	1.00270
0.0	0.20000	1436.12939	6.61081	1.00270
0.0	0.30000	1436.13623	6.61082	1.00269
0.0	0.40000	1436.14722	6.61085	1.00268
0.0	0.50000	1436.16626	6.61089	1.00267
0.0	0.60000	1436.20190	6.61096	1.00264
0.0	0.70000	1436.27563	6.61112	1.00259
0.0	0.80000	1436.48193	6.61160	1.00245
0.0	0.90000	1437.54736	6.61426	1.00171
10.00000	0.0	1436.12109	6.61079	1.00270
10.00000	0.10000	1436.12256	6.61080	1.00270
10.00000	0.20000	1436.12524	6.61080	1.00270
10.00000	0.30000	1436.13208	6.61082	1.00269
10.00000	0.40000	1436.14160	6.61084	1.00269
10.00000	0.50000	1436.16089	6.61087	1.00267
10.00000	0.60000	1436.19360	6.61094	1.00265
10.00000	0.70000	1436.26318	6.61109	1.00260
10.00000	0.80000	1436.45728	6.61154	1.00247
10.00000	0.90000	1437.45825	6.61403	1.00177
20.00000	0.0	1436.11157	6.61078	1.00271
20.00000	0.10000	1436.11304	6.61078	1.00271
20.00000	0.20000	1436.11572	6.61078	1.00270
20.00000	0.30000	1436.12109	6.61080	1.00270
20.00000	0.40000	1436.12939	6.61081	1.00270
20.00000	0.50000	1436.14453	6.61084	1.00268
20.00000	0.60000	1436.17163	6.61090	1.00267
20.00000	0.70000	1436.22900	6.61102	1.00263
20.00000	0.80000	1436.38623	6.61138	1.00252
20.00000	0.90000	1437.20508	6.61338	1.00194
30.00000	0.0	1436.09790	6.61075	1.00272
30.00000	0.10000	1436.09937	6.61075	1.00272
30.00000	0.20000	1436.10059	6.61076	1.00272
30.00000	0.30000	1436.10352	6.61076	1.00271
30.00000	0.40000	1436.11035	6.61077	1.00271
30.00000	0.50000	1436.11987	6.61079	1.00270
30.00000	0.60000	1436.13770	6.61082	1.00269
30.00000	0.70000	1436.17578	6.61090	1.00266
30.00000	0.80000	1436.28101	6.61112	1.00259
30.00000	0.90000	1436.82373	6.61241	1.00221
40.00000	0.0	1436.08154	6.61072	1.00273
40.00000	0.10000	1436.08154	6.61072	1.00273
40.00000	0.20000	1436.08301	6.61072	1.00273
40.00000	0.30000	1436.08423	6.61072	1.00273
40.00000	0.40000	1436.08716	6.61073	1.00272

S = 1.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
40.00000	0.50000	1436.08984	6.61073	1.00272
40.00000	0.60000	1436.09790	6.61074	1.00272
40.00000	0.70000	1436.11304	6.61076	1.00271
40.00000	0.80000	1436.15405	6.61083	1.00268
40.00000	0.90000	1436.36719	6.61125	1.00253
50.00000	0.0	1436.06519	6.61069	1.00274
50.00000	0.10000	1436.06519	6.61069	1.00274
50.00000	0.20000	1436.06519	6.61069	1.00274
50.00000	0.30000	1436.06372	6.61068	1.00274
50.00000	0.40000	1436.06250	6.61068	1.00274
50.00000	0.50000	1436.06104	6.61068	1.00274
50.00000	0.60000	1436.05688	6.61066	1.00275
50.00000	0.70000	1436.04883	6.61063	1.00275
50.00000	0.80000	1436.02563	6.61053	1.00277
50.00000	0.90000	1435.90942	6.61010	1.00285
60.00000	0.0	1436.05151	6.61067	1.00275
60.00000	0.10000	1436.05151	6.61067	1.00275
60.00000	0.20000	1436.05005	6.61067	1.00275
60.00000	0.30000	1436.04736	6.61066	1.00275
60.00000	0.40000	1436.04346	6.61065	1.00276
60.00000	0.50000	1436.03516	6.61063	1.00276
60.00000	0.60000	1436.02295	6.61059	1.00277
60.00000	0.70000	1435.99414	6.61051	1.00279
60.00000	0.80000	1435.91626	6.61029	1.00284
60.00000	0.90000	1435.51636	6.60914	1.00312
70.00000	0.0	1436.04199	6.61066	1.00276
70.00000	0.10000	1436.04199	6.61066	1.00276
70.00000	0.20000	1436.03931	6.61065	1.00276
70.00000	0.30000	1436.03662	6.61064	1.00276
70.00000	0.40000	1436.02979	6.61063	1.00276
70.00000	0.50000	1436.01880	6.61060	1.00277
70.00000	0.60000	1435.99976	6.61055	1.00279
70.00000	0.70000	1435.95874	6.61044	1.00281
70.00000	0.80000	1435.84521	6.61015	1.00289
70.00000	0.90000	1435.25854	6.60854	1.00330
80.00000	0.0	1436.03931	6.61066	1.00276
80.00000	0.10000	1436.03931	6.61066	1.00276
80.00000	0.20000	1436.03662	6.61065	1.00276
80.00000	0.30000	1436.03247	6.61064	1.00276
80.00000	0.40000	1436.02563	6.61063	1.00277
80.00000	0.50000	1436.01465	6.61060	1.00278
80.00000	0.60000	1435.99292	6.61055	1.00279
80.00000	0.70000	1435.94922	6.61044	1.00282
80.00000	0.80000	1435.82495	6.61014	1.00291
80.00000	0.90000	1435.18628	6.60845	1.00335

S = 1.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
90.00000	0.0	1436.04468	6.61068	1.00275
90.00000	0.10000	1436.04468	6.61068	1.00275
90.00000	0.20000	1436.04199	6.61067	1.00276
90.00000	0.30000	1436.03931	6.61067	1.00276
90.00000	0.40000	1436.03369	6.61066	1.00276
90.00000	0.50000	1436.02417	6.61063	1.00277
90.00000	0.60000	1436.00635	6.61060	1.00278
90.00000	0.70000	1435.96826	6.61051	1.00281
90.00000	0.80000	1435.86572	6.61028	1.00288
90.00000	0.90000	1435.33203	6.60894	1.00325
100.00000	0.0	1436.05835	6.61072	1.00274
100.00000	0.10000	1436.05835	6.61072	1.00274
100.00000	0.20000	1436.05688	6.61072	1.00275
100.00000	0.30000	1436.05566	6.61072	1.00275
100.00000	0.40000	1436.05298	6.61072	1.00275
100.00000	0.50000	1436.04736	6.61070	1.00275
100.00000	0.60000	1436.03931	6.61069	1.00276
100.00000	0.70000	1436.02002	6.61067	1.00277
100.00000	0.80000	1435.96826	6.61058	1.00281
100.00000	0.90000	1435.70068	6.61003	1.00299
110.00000	0.0	1436.07886	6.61077	1.00273
110.00000	0.10000	1436.07886	6.61077	1.00273
110.00000	0.20000	1436.07886	6.61077	1.00273
110.00000	0.30000	1436.08032	6.61078	1.00273
110.00000	0.40000	1436.08154	6.61078	1.00273
110.00000	0.50000	1436.08423	6.61080	1.00273
110.00000	0.60000	1436.08838	6.61082	1.00272
110.00000	0.70000	1436.09937	6.61088	1.00272
110.00000	0.80000	1436.12671	6.61101	1.00270
110.00000	0.90000	1436.27002	6.61165	1.00260
120.00000	0.0	1436.10474	6.61083	1.00271
120.00000	0.10000	1436.10474	6.61083	1.00271
120.00000	0.20000	1436.10742	6.61084	1.00271
120.00000	0.30000	1436.11157	6.61085	1.00271
120.00000	0.40000	1436.11841	6.61088	1.00270
120.00000	0.50000	1436.13086	6.61092	1.00269
120.00000	0.60000	1436.15259	6.61099	1.00268
120.00000	0.70000	1436.19897	6.61114	1.00265
120.00000	0.80000	1436.32739	6.61155	1.00256
120.00000	0.90000	1436.99463	6.61367	1.00209
130.00000	0.0	1436.13354	6.61090	1.00269
130.00000	0.10000	1436.13477	6.61090	1.00269
130.00000	0.20000	1436.13892	6.61092	1.00269
130.00000	0.30000	1436.14722	6.61094	1.00268
130.00000	0.40000	1436.15942	6.61098	1.00267

S = 1.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
130.00000	0.50000	1436.18262	6.61104	1.00266
130.00000	0.60000	1436.22363	6.61117	1.00263
130.00000	0.70000	1436.31250	6.61143	1.00257
130.00000	0.80000	1436.55420	6.61216	1.00240
130.00000	0.90000	1437.80591	6.61592	1.00153
140.00000	0.0	1436.16357	6.61097	1.00267
140.00000	0.10000	1436.16479	6.61097	1.00267
140.00000	0.20000	1436.17163	6.61099	1.00267
140.00000	0.30000	1436.18262	6.61102	1.00266
140.00000	0.40000	1436.20190	6.61108	1.00264
140.00000	0.50000	1436.23584	6.61118	1.00262
140.00000	0.60000	1436.29614	6.61135	1.00258
140.00000	0.70000	1436.42578	6.61172	1.00249
140.00000	0.80000	1436.78394	6.61276	1.00224
140.00000	0.90000	1438.62646	6.61818	1.00095
150.00000	0.0	1436.19092	6.61104	1.00265
150.00000	0.10000	1436.19360	6.61104	1.00265
150.00000	0.20000	1436.20044	6.61106	1.00265
150.00000	0.30000	1436.21533	6.61110	1.00264
150.00000	0.40000	1436.23999	6.61117	1.00262
150.00000	0.50000	1436.28369	6.61130	1.00259
150.00000	0.60000	1436.36304	6.61152	1.00253
150.00000	0.70000	1436.52979	6.61198	1.00242
150.00000	0.80000	1436.99316	6.61331	1.00209
150.00000	0.90000	1439.37524	6.62024	1.00043

S = 1.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	957.41113	5.04492	1.50406
0.0	0.10000	957.41162	5.04492	1.50406
0.0	0.20000	957.41357	5.04492	1.50405
0.0	0.30000	957.41772	5.04493	1.50405
0.0	0.40000	957.42383	5.04494	1.50404
0.0	0.50000	957.43481	5.04495	1.50402
0.0	0.60000	957.45532	5.04498	1.50399
0.0	0.70000	957.49780	5.04504	1.50392
0.0	0.80000	957.61621	5.04526	1.50373
10.00000	0.0	957.40796	5.04492	1.50406
10.00000	0.10000	957.40869	5.04492	1.50406
10.00000	0.20000	957.41040	5.04492	1.50406
10.00000	0.30000	957.41357	5.04492	1.50405
10.00000	0.40000	957.41943	5.04493	1.50404
10.00000	0.50000	957.42920	5.04494	1.50403
10.00000	0.60000	957.44751	5.04496	1.50400
10.00000	0.70000	957.48584	5.04501	1.50394
10.00000	0.80000	957.59131	5.04519	1.50377
20.00000	0.0	957.39893	5.04490	1.50408
20.00000	0.10000	957.39941	5.04490	1.50407
20.00000	0.20000	957.40015	5.04490	1.50407
20.00000	0.30000	957.40259	5.04490	1.50407
20.00000	0.40000	957.40625	5.04490	1.50406
20.00000	0.50000	957.41284	5.04490	1.50405
20.00000	0.60000	957.42505	5.04490	1.50403
20.00000	0.70000	957.45044	5.04493	1.50399
20.00000	0.80000	957.52100	5.04500	1.50388
30.00000	0.0	957.38550	5.04488	1.50410
30.00000	0.10000	957.38550	5.04487	1.50410
30.00000	0.20000	957.38550	5.04487	1.50410
30.00000	0.30000	957.38623	5.04487	1.50410
30.00000	0.40000	957.38745	5.04486	1.50409
30.00000	0.50000	957.38867	5.04485	1.50409
30.00000	0.60000	957.39233	5.04483	1.50409
30.00000	0.70000	957.39819	5.04480	1.50408
30.00000	0.80000	957.41650	5.04474	1.50405
40.00000	0.0	957.36987	5.04485	1.50412
40.00000	0.10000	957.36914	5.04484	1.50412
40.00000	0.20000	957.36865	5.04484	1.50412
40.00000	0.30000	957.36743	5.04483	1.50412
40.00000	0.40000	957.36499	5.04481	1.50413
40.00000	0.50000	957.36060	5.04479	1.50414
40.00000	0.60000	957.35327	5.04475	1.50415
40.00000	0.70000	957.33765	5.04466	1.50417
40.00000	0.80000	957.29443	5.04443	1.50424

S = 1.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.0	957.35400	5.04482	1.50415
50.00000	0.10000	957.35400	5.04482	1.50415
50.00000	0.20000	957.35205	5.04481	1.50415
50.00000	0.30000	957.34863	5.04479	1.50415
50.00000	0.40000	957.34302	5.04477	1.50416
50.00000	0.50000	957.33398	5.04474	1.50418
50.00000	0.60000	957.31641	5.04467	1.50420
50.00000	0.70000	957.27930	5.04453	1.50426
50.00000	0.80000	957.17749	5.04415	1.50442
60.00000	0.0	957.34253	5.04480	1.50416
60.00000	0.10000	957.34180	5.04480	1.50416
60.00000	0.20000	957.33936	5.04479	1.50417
60.00000	0.30000	957.33447	5.04477	1.50418
60.00000	0.40000	957.32666	5.04475	1.50419
60.00000	0.50000	957.31274	5.04470	1.50421
60.00000	0.60000	957.28711	5.04462	1.50425
60.00000	0.70000	957.23389	5.04444	1.50433
60.00000	0.80000	957.08569	5.04395	1.50457
70.00000	0.0	957.33643	5.04480	1.50417
70.00000	0.10000	957.33569	5.04480	1.50417
70.00000	0.20000	957.33276	5.04479	1.50418
70.00000	0.30000	957.32739	5.04477	1.50419
70.00000	0.40000	957.31812	5.04475	1.50420
70.00000	0.50000	957.30249	5.04470	1.50423
70.00000	0.60000	957.27319	5.04461	1.50427
70.00000	0.70000	957.21143	5.04442	1.50437
70.00000	0.80000	957.04077	5.04389	1.50464
80.00000	0.0	957.33887	5.04482	1.50417
80.00000	0.10000	957.33813	5.04482	1.50417
80.00000	0.20000	957.33521	5.04481	1.50418
80.00000	0.30000	957.33032	5.04480	1.50418
80.00000	0.40000	957.32129	5.04478	1.50420
80.00000	0.50000	957.30615	5.04474	1.50422
80.00000	0.60000	957.27881	5.04466	1.50426
80.00000	0.70000	957.21997	5.04449	1.50436
80.00000	0.80000	957.05737	5.04401	1.50461
90.00000	0.0	957.35034	5.04487	1.50415
90.00000	0.10000	957.34912	5.04487	1.50415
90.00000	0.20000	957.34741	5.04486	1.50416
90.00000	0.30000	957.34375	5.04486	1.50416
90.00000	0.40000	957.33765	5.04484	1.50417
90.00000	0.50000	957.32617	5.04481	1.50419
90.00000	0.60000	957.30615	5.04476	1.50422
90.00000	0.70000	957.26294	5.04465	1.50429
90.00000	0.80000	957.14453	5.04434	1.50447

S = 1.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
100.00000	0.0	957.37036	5.04494	1.50412
100.00000	0.10000	957.37036	5.04494	1.50412
100.00000	0.20000	957.36987	5.04494	1.50412
100.00000	0.30000	957.36865	5.04494	1.50412
100.00000	0.40000	957.36621	5.04494	1.50413
100.00000	0.50000	957.36255	5.04493	1.50413
100.00000	0.60000	957.35645	5.04493	1.50414
100.00000	0.70000	957.34180	5.04492	1.50416
100.00000	0.80000	957.30298	5.04488	1.50423
110.00000	0.0	957.39941	5.04502	1.50407
110.00000	0.10000	957.39941	5.04502	1.50407
110.00000	0.20000	957.40063	5.04503	1.50407
110.00000	0.30000	957.40308	5.04504	1.50407
110.00000	0.40000	957.40674	5.04506	1.50406
110.00000	0.50000	957.41357	5.04509	1.50405
110.00000	0.60000	957.42627	5.04515	1.50403
110.00000	0.70000	957.45239	5.04527	1.50399
110.00000	0.80000	957.52466	5.04559	1.50388
120.00000	0.0	957.43408	5.04513	1.50402
120.00000	0.10000	957.43530	5.04513	1.50402
120.00000	0.20000	957.43848	5.04514	1.50401
120.00000	0.30000	957.44507	5.04516	1.50400
120.00000	0.40000	957.45654	5.04521	1.50398
120.00000	0.50000	957.47534	5.04527	1.50395
120.00000	0.60000	957.51123	5.04541	1.50390
120.00000	0.70000	957.58594	5.04568	1.50378
120.00000	0.80000	957.79297	5.04643	1.50346
130.00000	0.0	957.47168	5.04523	1.50396
130.00000	0.10000	957.47412	5.04524	1.50396
130.00000	0.20000	957.47974	5.04526	1.50395
130.00000	0.30000	957.49121	5.04530	1.50393
130.00000	0.40000	957.51001	5.04536	1.50390
130.00000	0.50000	957.54346	5.04548	1.50385
130.00000	0.60000	957.60352	5.04568	1.50375
130.00000	0.70000	957.73218	5.04612	1.50355
130.00000	0.80000	958.08545	5.04734	1.50300
140.00000	0.0	957.51001	5.04534	1.50390
140.00000	0.10000	957.51245	5.04535	1.50390
140.00000	0.20000	957.52100	5.04537	1.50388
140.00000	0.30000	957.53662	5.04542	1.50386
140.00000	0.40000	957.56348	5.04551	1.50382
140.00000	0.50000	957.61011	5.04566	1.50374
140.00000	0.60000	957.69580	5.04595	1.50361
140.00000	0.70000	957.87744	5.04655	1.50332
140.00000	0.80000	958.37671	5.04823	1.50254

S = 1.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	957.54395	5.04543	1.50385
150.00000	0.10000	957.54712	5.04544	1.50384
150.00000	0.20000	957.55811	5.04548	1.50383
150.00000	0.30000	957.57812	5.04554	1.50379
150.00000	0.40000	957.61206	5.04565	1.50374
150.00000	0.50000	957.67090	5.04584	1.50365
150.00000	0.60000	957.77905	5.04619	1.50348
150.00000	0.70000	958.00806	5.04694	1.50312
150.00000	0.80000	958.63892	5.04903	1.50213

S = 2.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	718.03516	4.16436	2.00547
0.0	0.10000	718.03516	4.16436	2.00547
0.0	0.20000	718.03516	4.16435	2.00547
0.0	0.30000	718.03516	4.16434	2.00547
0.0	0.40000	718.03516	4.16432	2.00547
0.0	0.50000	718.03516	4.16429	2.00547
0.0	0.60000	718.03516	4.16424	2.00547
0.0	0.70000	718.03516	4.16414	2.00547
0.0	0.80000	718.03516	4.16389	2.00547
10.00000	0.0	718.03223	4.16436	2.00548
10.00000	0.10000	718.03223	4.16436	2.00548
10.00000	0.20000	718.03223	4.16435	2.00548
10.00000	0.30000	718.03174	4.16434	2.00548
10.00000	0.40000	718.03125	4.16432	2.00548
10.00000	0.50000	718.03003	4.16428	2.00549
10.00000	0.60000	718.02808	4.16422	2.00549
10.00000	0.70000	718.02368	4.16410	2.00550
10.00000	0.80000	718.01196	4.16383	2.00554
20.00000	0.0	718.02393	4.16434	2.00550
20.00000	0.10000	718.02368	4.16434	2.00550
20.00000	0.20000	718.02295	4.16433	2.00551
20.00000	0.30000	718.02173	4.16432	2.00551
20.00000	0.40000	718.01880	4.16429	2.00552
20.00000	0.50000	718.01489	4.16425	2.00553
20.00000	0.60000	718.00732	4.16417	2.00555
20.00000	0.70000	717.99097	4.16403	2.00560
20.00000	0.80000	717.94604	4.16365	2.00572
30.00000	0.0	718.01147	4.16432	2.00554
30.00000	0.10000	718.01099	4.16432	2.00554
30.00000	0.20000	718.00928	4.16430	2.00554
30.00000	0.30000	718.00659	4.16429	2.00555
30.00000	0.40000	718.00146	4.16426	2.00557
30.00000	0.50000	717.99268	4.16420	2.00559
30.00000	0.60000	717.97681	4.16410	2.00564
30.00000	0.70000	717.94312	4.16391	2.00573
30.00000	0.80000	717.84985	4.16340	2.00599
40.00000	0.0	717.99731	4.16430	2.00558
40.00000	0.10000	717.99658	4.16429	2.00558
40.00000	0.20000	717.99438	4.16428	2.00559
40.00000	0.30000	717.98950	4.16426	2.00560
40.00000	0.40000	717.98169	4.16422	2.00562
40.00000	0.50000	717.96777	4.16415	2.00566
40.00000	0.60000	717.94263	4.16404	2.00573
40.00000	0.70000	717.88916	4.16379	2.00588
40.00000	0.80000	717.74219	4.16313	2.00629

S = 2.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.0	717.98462	4.16428	2.00561
50.00000	0.10000	717.98364	4.16428	2.00562
50.00000	0.20000	717.98071	4.16426	2.00562
50.00000	0.30000	717.97412	4.16424	2.00564
50.00000	0.40000	717.96362	4.16419	2.00567
50.00000	0.50000	717.94556	4.16412	2.00572
50.00000	0.60000	717.91162	4.16398	2.00582
50.00000	0.70000	717.84058	4.16370	2.00602
50.00000	0.80000	717.64453	4.16291	2.00656
60.00000	0.0	717.97656	4.16428	2.00564
60.00000	0.10000	717.97559	4.16428	2.00564
60.00000	0.20000	717.97144	4.16426	2.00565
60.00000	0.30000	717.96436	4.16424	2.00567
60.00000	0.40000	717.95190	4.16419	2.00570
60.00000	0.50000	717.93091	4.16411	2.00576
60.00000	0.60000	717.89185	4.16397	2.00587
60.00000	0.70000	717.80884	4.16366	2.00610
60.00000	0.80000	717.58105	4.16281	2.00674
70.00000	0.0	717.97559	4.16430	2.00564
70.00000	0.10000	717.97412	4.16430	2.00564
70.00000	0.20000	717.97046	4.16428	2.00565
70.00000	0.30000	717.96289	4.16426	2.00567
70.00000	0.40000	717.95068	4.16422	2.00571
70.00000	0.50000	717.92871	4.16414	2.00577
70.00000	0.60000	717.88892	4.16401	2.00588
70.00000	0.70000	717.80493	4.16372	2.00612
70.00000	0.80000	717.57251	4.16290	2.00677
80.00000	0.0	717.98340	4.16435	2.00562
80.00000	0.10000	717.98242	4.16435	2.00562
80.00000	0.20000	717.97925	4.16434	2.00563
80.00000	0.30000	717.97290	4.16432	2.00565
80.00000	0.40000	717.96191	4.16428	2.00568
80.00000	0.50000	717.94312	4.16422	2.00573
80.00000	0.60000	717.90869	4.16412	2.00583
80.00000	0.70000	717.83594	4.16388	2.00603
80.00000	0.80000	717.63452	4.16322	2.00659
90.00000	0.0	718.00171	4.16443	2.00557
90.00000	0.10000	718.00122	4.16442	2.00557
90.00000	0.20000	717.99878	4.16442	2.00557
90.00000	0.30000	717.99463	4.16441	2.00559
90.00000	0.40000	717.98779	4.16439	2.00560
90.00000	0.50000	717.97559	4.16436	2.00564
90.00000	0.60000	717.95337	4.16430	2.00570
90.00000	0.70000	717.90625	4.16417	2.00583
90.00000	0.80000	717.77588	4.16379	2.00620

S = 2.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
100.00000	0.0	718.03003	4.16453	2.00549
100.00000	0.10000	718.03003	4.16453	2.00549
100.00000	0.20000	718.02979	4.16453	2.00549
100.00000	0.30000	718.02905	4.16453	2.00549
100.00000	0.40000	718.02808	4.16454	2.00549
100.00000	0.50000	718.02612	4.16455	2.00550
100.00000	0.60000	718.02271	4.16456	2.00551
100.00000	0.70000	718.01538	4.16458	2.00553
100.00000	0.80000	717.99536	4.16461	2.00558
110.00000	0.0	718.06738	4.16466	2.00538
110.00000	0.10000	718.06812	4.16466	2.00538
110.00000	0.20000	718.07007	4.16467	2.00537
110.00000	0.30000	718.07422	4.16469	2.00536
110.00000	0.40000	718.08057	4.16472	2.00535
110.00000	0.50000	718.09229	4.16478	2.00531
110.00000	0.60000	718.11353	4.16488	2.00525
110.00000	0.70000	718.15845	4.16508	2.00513
110.00000	0.80000	718.28247	4.16564	2.00478
120.00000	0.0	718.11108	4.16480	2.00526
120.00000	0.10000	718.11255	4.16480	2.00526
120.00000	0.20000	718.11768	4.16483	2.00524
120.00000	0.30000	718.12671	4.16486	2.00522
120.00000	0.40000	718.14258	4.16493	2.00517
120.00000	0.50000	718.16992	4.16503	2.00510
120.00000	0.60000	718.21997	4.16524	2.00496
120.00000	0.70000	718.32593	4.16566	2.00466
120.00000	0.80000	718.61865	4.16682	2.00384
130.00000	0.0	718.15747	4.16495	2.00513
130.00000	0.10000	718.16016	4.16496	2.00512
130.00000	0.20000	718.16821	4.16499	2.00510
130.00000	0.30000	718.18311	4.16505	2.00506
130.00000	0.40000	718.20874	4.16514	2.00499
130.00000	0.50000	718.25293	4.16531	2.00486
130.00000	0.60000	718.33374	4.16561	2.00464
130.00000	0.70000	718.50513	4.16627	2.00416
130.00000	0.80000	718.97729	4.16806	2.00284
140.00000	0.0	718.20337	4.16509	2.00500
140.00000	0.10000	718.20679	4.16511	2.00499
140.00000	0.20000	718.21753	4.16514	2.00496
140.00000	0.30000	718.23804	4.16522	2.00491
140.00000	0.40000	718.27344	4.16535	2.00481
140.00000	0.50000	718.33423	4.16557	2.00464
140.00000	0.60000	718.44531	4.16598	2.00433
140.00000	0.70000	718.68091	4.16685	2.00367
140.00000	0.80000	719.32896	4.16926	2.00187

S = 2.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	718.24438	4.16522	2.00489
150.00000	0.10000	718.24829	4.16523	2.00488
150.00000	0.20000	718.26196	4.16528	2.00484
150.00000	0.30000	718.28760	4.16537	2.00477
150.00000	0.40000	718.33154	4.16553	2.00465
150.00000	0.50000	718.40674	4.16580	2.00444
150.00000	0.60000	718.54517	4.16631	2.00405
150.00000	0.70000	718.83765	4.16737	2.00323
150.00000	0.80000	719.64307	4.17033	2.00099

S = 2.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	574.39209	3.58855	2.50700
0.0	0.10000	574.39136	3.58854	2.50700
0.0	0.20000	574.38892	3.58853	2.50701
0.0	0.30000	574.38452	3.58850	2.50703
0.0	0.40000	574.37695	3.58844	2.50706
0.0	0.50000	574.36377	3.58835	2.50712
0.0	0.60000	574.33984	3.58819	2.50723
0.0	0.70000	574.28882	3.58786	2.50745
10.00000	0.0	574.38940	3.58855	2.50701
10.00000	0.10000	574.38843	3.58854	2.50701
10.00000	0.20000	574.38599	3.58852	2.50702
10.00000	0.30000	574.38110	3.58849	2.50705
10.00000	0.40000	574.37305	3.58843	2.50708
10.00000	0.50000	574.35913	3.58834	2.50714
10.00000	0.60000	574.33325	3.58817	2.50725
10.00000	0.70000	574.27832	3.58783	2.50749
20.00000	0.0	574.38184	3.58853	2.50704
20.00000	0.10000	574.38062	3.58853	2.50705
20.00000	0.20000	574.37793	3.58851	2.50706
20.00000	0.30000	574.37207	3.58847	2.50708
20.00000	0.40000	574.36230	3.58842	2.50713
20.00000	0.50000	574.34546	3.58831	2.50720
20.00000	0.60000	574.31470	3.58814	2.50734
20.00000	0.70000	574.24927	3.58777	2.50762
30.00000	0.0	574.37109	3.58852	2.50709
30.00000	0.10000	574.36963	3.58851	2.50710
30.00000	0.20000	574.36597	3.58849	2.50711
30.00000	0.30000	574.35913	3.58845	2.50714
30.00000	0.40000	574.34692	3.58839	2.50719
30.00000	0.50000	574.32642	3.58828	2.50728
30.00000	0.60000	574.28857	3.58808	2.50745
30.00000	0.70000	574.20801	3.58767	2.50780
40.00000	0.0	574.35938	3.58851	2.50714
40.00000	0.10000	574.35815	3.58850	2.50715
40.00000	0.20000	574.35376	3.58848	2.50716
40.00000	0.30000	574.34521	3.58844	2.50720
40.00000	0.40000	574.33081	3.58837	2.50727
40.00000	0.50000	574.30615	3.58825	2.50737
40.00000	0.60000	574.26050	3.58804	2.50757
40.00000	0.70000	574.16406	3.58759	2.50799
50.00000	0.0	574.35059	3.58851	2.50718
50.00000	0.10000	574.34888	3.58850	2.50719
50.00000	0.20000	574.34375	3.58848	2.50721
50.00000	0.30000	574.33423	3.58844	2.50725
50.00000	0.40000	574.31787	3.58837	2.50732

S = 2.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.50000	574.28979	3.58825	2.50744
50.00000	0.60000	574.23828	3.58802	2.50767
50.00000	0.70000	574.12891	3.58755	2.50815
60.00000	0.0	574.34668	3.58853	2.50720
60.00000	0.10000	574.34497	3.58852	2.50720
60.00000	0.20000	574.33984	3.58850	2.50723
60.00000	0.30000	574.32983	3.58846	2.50727
60.00000	0.40000	574.31274	3.58839	2.50734
60.00000	0.50000	574.28345	3.58828	2.50747
60.00000	0.60000	574.22900	3.58806	2.50771
60.00000	0.70000	574.11475	3.58760	2.50821
70.00000	0.0	574.35107	3.58858	2.50718
70.00000	0.10000	574.34961	3.58857	2.50718
70.00000	0.20000	574.34473	3.58855	2.50721
70.00000	0.30000	574.33521	3.58852	2.50725
70.00000	0.40000	574.31909	3.58846	2.50732
70.00000	0.50000	574.29126	3.58835	2.50744
70.00000	0.60000	574.24023	3.58816	2.50766
70.00000	0.70000	574.13208	3.58775	2.50813
80.00000	0.0	574.36597	3.58866	2.50711
80.00000	0.10000	574.36475	3.58866	2.50712
80.00000	0.20000	574.36084	3.58864	2.50713
80.00000	0.30000	574.35303	3.58862	2.50717
80.00000	0.40000	574.34009	3.58857	2.50723
80.00000	0.50000	574.31763	3.58850	2.50732
80.00000	0.60000	574.27612	3.58835	2.50750
80.00000	0.70000	574.18921	3.58804	2.50788
90.00000	0.0	574.39209	3.58878	2.50700
90.00000	0.10000	574.39136	3.58878	2.50700
90.00000	0.20000	574.38892	3.58877	2.50701
90.00000	0.30000	574.38452	3.58875	2.50703
90.00000	0.40000	574.37695	3.58873	2.50706
90.00000	0.50000	574.36377	3.58870	2.50712
90.00000	0.60000	574.33984	3.58863	2.50723
90.00000	0.70000	574.28882	3.58848	2.50745
100.00000	0.0	574.42896	3.58892	2.50684
100.00000	0.10000	574.42896	3.58892	2.50684
100.00000	0.20000	574.42896	3.58893	2.50684
100.00000	0.30000	574.42896	3.58893	2.50684
100.00000	0.40000	574.42920	3.58894	2.50684
100.00000	0.50000	574.42944	3.58896	2.50683
100.00000	0.60000	574.42993	3.58899	2.50683
100.00000	0.70000	574.43091	3.58905	2.50683
110.00000	0.0	574.47510	3.58909	2.50664
110.00000	0.10000	574.47583	3.58910	2.50663

S = 2.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.20000	574.47900	3.58911	2.50662
110.00000	0.30000	574.48486	3.58914	2.50659
110.00000	0.40000	574.49463	3.58919	2.50655
110.00000	0.50000	574.51147	3.58927	2.50648
110.00000	0.60000	574.54272	3.58942	2.50634
110.00000	0.70000	574.60840	3.58973	2.50605
120.00000	0.0	574.52783	3.58929	2.50641
120.00000	0.10000	574.52979	3.58929	2.50640
120.00000	0.20000	574.53638	3.58932	2.50637
120.00000	0.30000	574.54858	3.58937	2.50632
120.00000	0.40000	574.56934	3.58946	2.50622
120.00000	0.50000	574.60522	3.58962	2.50607
120.00000	0.60000	574.67114	3.58990	2.50578
120.00000	0.70000	574.81079	3.59049	2.50517
130.00000	0.0	574.58325	3.58948	2.50616
130.00000	0.10000	574.58643	3.58949	2.50615
130.00000	0.20000	574.59644	3.58953	2.50611
130.00000	0.30000	574.61523	3.58961	2.50602
130.00000	0.40000	574.64771	3.58974	2.50588
130.00000	0.50000	574.70361	3.58997	2.50564
130.00000	0.60000	574.80640	3.59039	2.50519
130.00000	0.70000	575.02319	3.59128	2.50425
140.00000	0.0	574.63696	3.58966	2.50593
140.00000	0.10000	574.64111	3.58968	2.50591
140.00000	0.20000	574.65454	3.58973	2.50585
140.00000	0.30000	574.68018	3.58983	2.50574
140.00000	0.40000	574.72388	3.59001	2.50555
140.00000	0.50000	574.79907	3.59031	2.50522
140.00000	0.60000	574.93726	3.59086	2.50462
140.00000	0.70000	575.22949	3.59203	2.50335
150.00000	0.0	574.68457	3.58982	2.50572
150.00000	0.10000	574.68970	3.58984	2.50570
150.00000	0.20000	574.70630	3.58991	2.50563
150.00000	0.30000	574.73779	3.59003	2.50549
150.00000	0.40000	574.79126	3.59024	2.50526
150.00000	0.50000	574.88354	3.59060	2.50485
150.00000	0.60000	575.05322	3.59127	2.50412
150.00000	0.70000	575.41187	3.59269	2.50255

S = 3.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	478.61328	3.17759	3.00869
0.0	0.10000	478.61157	3.17758	3.00870
0.0	0.20000	478.60669	3.17755	3.00873
0.0	0.30000	478.59717	3.17749	3.00879
0.0	0.40000	478.58105	3.17740	3.00889
0.0	0.50000	478.55322	3.17724	3.00907
0.0	0.60000	478.50220	3.17694	3.00939
0.0	0.70000	478.39404	3.17632	3.01007
10.00000	0.0	478.61084	3.17759	3.00871
10.00000	0.10000	478.60938	3.17758	3.00872
10.00000	0.20000	478.60400	3.17755	3.00875
10.00000	0.30000	478.59448	3.17749	3.00881
10.00000	0.40000	478.57788	3.17739	3.00891
10.00000	0.50000	478.54932	3.17723	3.00909
10.00000	0.60000	478.49634	3.17693	3.00943
10.00000	0.70000	478.38501	3.17631	3.01013
20.00000	0.0	478.60449	3.17758	3.00875
20.00000	0.10000	478.60278	3.17757	3.00876
20.00000	0.20000	478.59717	3.17754	3.00879
20.00000	0.30000	478.58691	3.17748	3.00886
20.00000	0.40000	478.56885	3.17738	3.00897
20.00000	0.50000	478.53809	3.17721	3.00916
20.00000	0.60000	478.48120	3.17690	3.00952
20.00000	0.70000	478.36084	3.17626	3.01028
30.00000	0.0	478.59595	3.17758	3.00880
30.00000	0.10000	478.59399	3.17757	3.00881
30.00000	0.20000	478.58813	3.17754	3.00885
30.00000	0.30000	478.57642	3.17748	3.00892
30.00000	0.40000	478.55664	3.17737	3.00905
30.00000	0.50000	478.52271	3.17720	3.00926
30.00000	0.60000	478.45996	3.17688	3.00965
30.00000	0.70000	478.32764	3.17621	3.01049
40.00000	0.0	478.58765	3.17758	3.00885
40.00000	0.10000	478.58569	3.17758	3.00887
40.00000	0.20000	478.57886	3.17754	3.00891
40.00000	0.30000	478.56641	3.17748	3.00899
40.00000	0.40000	478.54468	3.17737	3.00912
40.00000	0.50000	478.50781	3.17720	3.00935
40.00000	0.60000	478.43994	3.17687	3.00978
40.00000	0.70000	478.29565	3.17618	3.01069
50.00000	0.0	478.58276	3.17761	3.00888
50.00000	0.10000	478.58057	3.17760	3.00890
50.00000	0.20000	478.57373	3.17757	3.00894
50.00000	0.30000	478.56030	3.17751	3.00902
50.00000	0.40000	478.53784	3.17740	3.00917
50.00000	0.50000	478.49927	3.17723	3.00941

S = 3.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.60000	478.42773	3.17690	3.00986
50.00000	0.70000	478.27686	3.17622	3.01081
60.00000	0.0	478.58423	3.17765	3.00887
60.00000	0.10000	478.58203	3.17764	3.00889
60.00000	0.20000	478.57520	3.17761	3.00893
60.00000	0.30000	478.56226	3.17756	3.00901
60.00000	0.40000	478.54004	3.17747	3.00915
60.00000	0.50000	478.50195	3.17730	3.00939
60.00000	0.60000	478.43164	3.17700	3.00983
60.00000	0.70000	478.28296	3.17636	3.01077
70.00000	0.0	478.59521	3.17774	3.00881
70.00000	0.10000	478.59326	3.17773	3.00882
70.00000	0.20000	478.58716	3.17771	3.00886
70.00000	0.30000	478.57544	3.17766	3.00893
70.00000	0.40000	478.55566	3.17758	3.00905
70.00000	0.50000	478.52124	3.17744	3.00927
70.00000	0.60000	478.45825	3.17718	3.00967
70.00000	0.70000	478.32495	3.17664	3.01051
80.00000	0.0	478.61719	3.17786	3.00867
80.00000	0.10000	478.61597	3.17785	3.00867
80.00000	0.20000	478.61133	3.17784	3.00870
80.00000	0.30000	478.60229	3.17780	3.00876
80.00000	0.40000	478.58691	3.17774	3.00886
80.00000	0.50000	478.56079	3.17765	3.00902
80.00000	0.60000	478.51245	3.17747	3.00933
80.00000	0.70000	478.41016	3.17708	3.00997
90.00000	0.0	478.65161	3.17802	3.00845
90.00000	0.10000	478.65088	3.17801	3.00846
90.00000	0.20000	478.64844	3.17801	3.00847
90.00000	0.30000	478.64380	3.17800	3.00850
90.00000	0.40000	478.63550	3.17797	3.00855
90.00000	0.50000	478.62183	3.17793	3.00864
90.00000	0.60000	478.59619	3.17785	3.00880
90.00000	0.70000	478.54224	3.17768	3.00914
100.00000	0.0	478.69751	3.17821	3.00816
100.00000	0.10000	478.69775	3.17822	3.00816
100.00000	0.20000	478.69824	3.17822	3.00816
100.00000	0.30000	478.69897	3.17823	3.00815
100.00000	0.40000	478.70068	3.17825	3.00814
100.00000	0.50000	478.70337	3.17828	3.00813
100.00000	0.60000	478.70825	3.17833	3.00809
100.00000	0.70000	478.71875	3.17844	3.00803
110.00000	0.0	478.75317	3.17844	3.00781
110.00000	0.10000	478.75439	3.17844	3.00780
110.00000	0.20000	478.75854	3.17846	3.00778

S = 3.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.30000	478.76611	3.17850	3.00773
110.00000	0.40000	478.77930	3.17857	3.00765
110.00000	0.50000	478.80200	3.17868	3.00751
110.00000	0.60000	478.84399	3.17889	3.00724
110.00000	0.70000	478.93213	3.17932	3.00669
120.00000	0.0	478.81519	3.17868	3.00742
120.00000	0.10000	478.81787	3.17869	3.00741
120.00000	0.20000	478.82568	3.17872	3.00736
120.00000	0.30000	478.84106	3.17879	3.00726
120.00000	0.40000	478.86719	3.17892	3.00710
120.00000	0.50000	478.91235	3.17912	3.00681
120.00000	0.60000	478.99512	3.17949	3.00629
120.00000	0.70000	479.17041	3.18029	3.00519
130.00000	0.0	478.87939	3.17892	3.00702
130.00000	0.10000	478.88330	3.17894	3.00700
130.00000	0.20000	478.89551	3.17899	3.00692
130.00000	0.30000	478.91870	3.17909	3.00677
130.00000	0.40000	478.95850	3.17926	3.00652
130.00000	0.50000	479.02661	3.17956	3.00609
130.00000	0.60000	479.15210	3.18011	3.00531
130.00000	0.70000	479.41699	3.18126	3.00365
140.00000	0.0	478.94116	3.17915	3.00663
140.00000	0.10000	478.94653	3.17917	3.00660
140.00000	0.20000	478.96265	3.17924	3.00650
140.00000	0.30000	478.99341	3.17937	3.00630
140.00000	0.40000	479.04590	3.17959	3.00597
140.00000	0.50000	479.13647	3.17998	3.00541
140.00000	0.60000	479.30273	3.18069	3.00436
140.00000	0.70000	479.65381	3.18219	3.00216
150.00000	0.0	478.99561	3.17935	3.00629
150.00000	0.10000	479.00195	3.17937	3.00625
150.00000	0.20000	479.02173	3.17946	3.00613
150.00000	0.30000	479.05908	3.17961	3.00589
150.00000	0.40000	479.12305	3.17988	3.00549
150.00000	0.50000	479.23291	3.18034	3.00480
150.00000	0.60000	479.43530	3.18119	3.00353
150.00000	0.70000	479.86230	3.18299	3.00086

S = 3.5 REVS./DAY

TABLE 2 (Continued)

i (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	410.18433	2.86696	3.51062
0.0	0.10000	410.18164	2.86695	3.51064
0.0	0.20000	410.17383	2.86691	3.51070
0.0	0.30000	410.15894	2.86682	3.51083
0.0	0.40000	410.13354	2.86667	3.51105
0.0	0.50000	410.08960	2.86642	3.51143
0.0	0.60000	410.00879	2.86596	3.51212
0.0	0.70000	409.83765	2.86502	3.51359
10.00000	0.0	410.18237	2.86696	3.51063
10.00000	0.10000	410.17993	2.86695	3.51065
10.00000	0.20000	410.17187	2.86690	3.51072
10.00000	0.30000	410.15674	2.86682	3.51085
10.00000	0.40000	410.13086	2.86667	3.51107
10.00000	0.50000	410.08643	2.86642	3.51145
10.00000	0.60000	410.00439	2.86596	3.51216
10.00000	0.70000	409.83057	2.86501	3.51365
20.00000	0.0	410.17749	2.86697	3.51067
20.00000	0.10000	410.17505	2.86695	3.51070
20.00000	0.20000	410.16675	2.86691	3.51077
20.00000	0.30000	410.15088	2.86682	3.51090
20.00000	0.40000	410.12402	2.86667	3.51113
20.00000	0.50000	410.07788	2.86642	3.51153
20.00000	0.60000	409.99268	2.86596	3.51226
20.00000	0.70000	409.81226	2.86499	3.51380
30.00000	0.0	410.17163	2.86698	3.51073
30.00000	0.10000	410.16870	2.86696	3.51075
30.00000	0.20000	410.16016	2.86692	3.51082
30.00000	0.30000	410.14355	2.86683	3.51096
30.00000	0.40000	410.11548	2.86668	3.51120
30.00000	0.50000	410.06714	2.86642	3.51162
30.00000	0.60000	409.97778	2.86596	3.51238
30.00000	0.70000	409.78906	2.86499	3.51400
40.00000	0.0	410.16699	2.86700	3.51077
40.00000	0.10000	410.16406	2.86698	3.51079
40.00000	0.20000	410.15503	2.86694	3.51087
40.00000	0.30000	410.13794	2.86686	3.51101
40.00000	0.40000	410.10889	2.86671	3.51126
40.00000	0.50000	410.05859	2.86646	3.51169
40.00000	0.60000	409.96631	2.86600	3.51248
40.00000	0.70000	409.77075	2.86503	3.51416
50.00000	0.0	410.16675	2.86705	3.51077
50.00000	0.10000	410.16382	2.86703	3.51079
50.00000	0.20000	410.15479	2.86699	3.51087
50.00000	0.30000	410.13770	2.86691	3.51101
50.00000	0.40000	410.10840	2.86677	3.51126
50.00000	0.50000	410.05835	2.86653	3.51169

S = 3.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.60000	409.96582	2.86609	3.51249
50.00000	0.70000	409.77002	2.86516	3.51416
60.00000	0.0	410.17407	2.86713	3.51070
60.00000	0.10000	410.17139	2.86712	3.51073
60.00000	0.20000	410.16284	2.86708	3.51080
60.00000	0.30000	410.14673	2.86700	3.51094
60.00000	0.40000	410.11914	2.86688	3.51117
60.00000	0.50000	410.07153	2.86666	3.51158
60.00000	0.60000	409.98413	2.86627	3.51233
60.00000	0.70000	409.79883	2.86542	3.51392
70.00000	0.0	410.19189	2.86725	3.51055
70.00000	0.10000	410.18970	2.86724	3.51057
70.00000	0.20000	410.18237	2.86721	3.51063
70.00000	0.30000	410.16821	2.86715	3.51075
70.00000	0.40000	410.14429	2.86705	3.51096
70.00000	0.50000	410.10327	2.86687	3.51131
70.00000	0.60000	410.02783	2.86654	3.51196
70.00000	0.70000	409.86768	2.86584	3.51333
80.00000	0.0	410.22217	2.86742	3.51029
80.00000	0.10000	410.22046	2.86741	3.51031
80.00000	0.20000	410.21509	2.86739	3.51035
80.00000	0.30000	410.20483	2.86735	3.51044
80.00000	0.40000	410.18726	2.86728	3.51059
80.00000	0.50000	410.15698	2.86716	3.51085
80.00000	0.60000	410.10156	2.86694	3.51132
80.00000	0.70000	409.98389	2.86645	3.51233
90.00000	0.0	410.26538	2.86762	3.50992
90.00000	0.10000	410.26440	2.86762	3.50993
90.00000	0.20000	410.26172	2.86761	3.50995
90.00000	0.30000	410.25684	2.86760	3.50999
90.00000	0.40000	410.24854	2.86758	3.51007
90.00000	0.50000	410.23364	2.86753	3.51019
90.00000	0.60000	410.20679	2.86744	3.51042
90.00000	0.70000	410.14990	2.86725	3.51091
100.00000	0.0	410.32080	2.86787	3.50945
100.00000	0.10000	410.32080	2.86788	3.50945
100.00000	0.20000	410.32202	2.86788	3.50944
100.00000	0.30000	410.32373	2.86790	3.50942
100.00000	0.40000	410.32690	2.86793	3.50940
100.00000	0.50000	410.33228	2.86797	3.50935
100.00000	0.60000	410.34204	2.86805	3.50927
100.00000	0.70000	410.36279	2.86822	3.50909
110.00000	0.0	410.38599	2.86816	3.50889
110.00000	0.10000	410.38770	2.86816	3.50888
110.00000	0.20000	410.39282	2.86819	3.50883

S = 3.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.30000	410.40259	2.86824	3.50875
110.00000	0.40000	410.41919	2.86833	3.50861
110.00000	0.50000	410.44824	2.86848	3.50836
110.00000	0.60000	410.50146	2.86875	3.50790
110.00000	0.70000	410.61377	2.86932	3.50694
120.00000	0.0	410.45776	2.86845	3.50828
120.00000	0.10000	410.46069	2.86846	3.50825
120.00000	0.20000	410.47046	2.86851	3.50817
120.00000	0.30000	410.48926	2.86860	3.50801
120.00000	0.40000	410.52100	2.86875	3.50774
120.00000	0.50000	410.57568	2.86901	3.50727
120.00000	0.60000	410.67627	2.86949	3.50641
120.00000	0.70000	410.88892	2.87050	3.50460
130.00000	0.0	410.53101	2.86875	3.50765
130.00000	0.10000	410.53564	2.86877	3.50761
130.00000	0.20000	410.55029	2.86884	3.50749
130.00000	0.30000	410.57788	2.86896	3.50725
130.00000	0.40000	410.62500	2.86918	3.50685
130.00000	0.50000	410.70605	2.86955	3.50616
130.00000	0.60000	410.85522	2.87023	3.50488
130.00000	0.70000	411.17041	2.87168	3.50220
140.00000	0.0	410.60132	2.86902	3.50705
140.00000	0.10000	410.60718	2.86905	3.50700
140.00000	0.20000	410.62622	2.86913	3.50684
140.00000	0.30000	410.66235	2.86930	3.50653
140.00000	0.40000	410.72437	2.86957	3.50600
140.00000	0.50000	410.83057	2.87005	3.50509
140.00000	0.60000	411.02588	2.87093	3.50343
140.00000	0.70000	411.43823	2.87280	3.49992
150.00000	0.0	410.66235	2.86926	3.50653
150.00000	0.10000	410.66968	2.86930	3.50647
150.00000	0.20000	410.69287	2.86940	3.50627
150.00000	0.30000	410.73633	2.86959	3.50590
150.00000	0.40000	410.81104	2.86992	3.50526
150.00000	0.50000	410.93921	2.87049	3.50417
150.00000	0.60000	411.17505	2.87154	3.50216
150.00000	0.70000	411.67261	2.87376	3.49792

S = 4.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	358.84814	2.62243	4.01284
0.0	0.10000	358.84448	2.62241	4.01288
0.0	0.20000	358.83374	2.62235	4.01300
0.0	0.30000	358.81274	2.62223	4.01323
0.0	0.40000	358.77710	2.62203	4.01363
0.0	0.50000	358.71606	2.62168	4.01432
0.0	0.60000	358.60327	2.62104	4.01558
0.0	0.70000	358.36426	2.61972	4.01826
10.00000	0.0	358.84668	2.62244	4.01285
10.00000	0.10000	358.84326	2.62242	4.01289
10.00000	0.20000	358.83228	2.62235	4.01302
10.00000	0.30000	358.81128	2.62223	4.01325
10.00000	0.40000	358.77539	2.62203	4.01365
10.00000	0.50000	358.71387	2.62168	4.01434
10.00000	0.60000	358.60010	2.62105	4.01561
10.00000	0.70000	358.35962	2.61972	4.01831
20.00000	0.0	358.84375	2.62245	4.01289
20.00000	0.10000	358.84009	2.62243	4.01293
20.00000	0.20000	358.82886	2.62236	4.01305
20.00000	0.30000	358.80762	2.62225	4.01329
20.00000	0.40000	358.77100	2.62204	4.01370
20.00000	0.50000	358.70825	2.62170	4.01440
20.00000	0.60000	358.59253	2.62106	4.01570
20.00000	0.70000	358.34741	2.61973	4.01844
30.00000	0.0	358.84033	2.62248	4.01292
30.00000	0.10000	358.83691	2.62245	4.01296
30.00000	0.20000	358.82544	2.62239	4.01309
30.00000	0.30000	358.80371	2.62228	4.01334
30.00000	0.40000	358.76636	2.62208	4.01375
30.00000	0.50000	358.70264	2.62173	4.01447
30.00000	0.60000	358.58472	2.62111	4.01579
30.00000	0.70000	358.33521	2.61979	4.01858
40.00000	0.0	358.83984	2.62252	4.01293
40.00000	0.10000	358.83618	2.62250	4.01297
40.00000	0.20000	358.82471	2.62244	4.01310
40.00000	0.30000	358.80273	2.62233	4.01334
40.00000	0.40000	358.76538	2.62214	4.01376
40.00000	0.50000	358.70142	2.62181	4.01448
40.00000	0.60000	358.58301	2.62120	4.01580
40.00000	0.70000	358.33276	2.61991	4.01861
50.00000	0.0	358.84473	2.62260	4.01288
50.00000	0.10000	358.84131	2.62258	4.01291
50.00000	0.20000	358.83008	2.62253	4.01304
50.00000	0.30000	358.80884	2.62242	4.01328
50.00000	0.40000	358.77271	2.62224	4.01368

S = 4.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
50.00000	0.50000	358.71021	2.62193	4.01438
50.00000	0.60000	358.59546	2.62136	4.01567
50.00000	0.70000	358.35205	2.62016	4.01839
60.00000	0.0	358.85864	2.62272	4.01272
60.00000	0.10000	358.85547	2.62270	4.01276
60.00000	0.20000	358.84521	2.62265	4.01287
60.00000	0.30000	358.82568	2.62256	4.01309
60.00000	0.40000	358.79224	2.62240	4.01346
60.00000	0.50000	358.73486	2.62213	4.01410
60.00000	0.60000	358.62915	2.62162	4.01529
60.00000	0.70000	358.40552	2.62056	4.01779
70.00000	0.0	358.88403	2.62288	4.01244
70.00000	0.10000	358.88135	2.62287	4.01247
70.00000	0.20000	358.87280	2.62283	4.01256
70.00000	0.30000	358.85620	2.62276	4.01275
70.00000	0.40000	358.82837	2.62263	4.01306
70.00000	0.50000	358.78003	2.62241	4.01360
70.00000	0.60000	358.69141	2.62201	4.01459
70.00000	0.70000	358.50342	2.62114	4.01670
80.00000	0.0	358.92285	2.62310	4.01200
80.00000	0.10000	358.92090	2.62309	4.01203
80.00000	0.20000	358.91455	2.62306	4.01209
80.00000	0.30000	358.90308	2.62302	4.01223
80.00000	0.40000	358.88306	2.62293	4.01245
80.00000	0.50000	358.84888	2.62279	4.01283
80.00000	0.60000	358.78589	2.62252	4.01353
80.00000	0.70000	358.65259	2.62195	4.01503
90.00000	0.0	358.97534	2.62336	4.01142
90.00000	0.10000	358.97437	2.62336	4.01143
90.00000	0.20000	358.97168	2.62335	4.01146
90.00000	0.30000	358.96655	2.62334	4.01152
90.00000	0.40000	358.95752	2.62331	4.01162
90.00000	0.50000	358.94238	2.62326	4.01179
90.00000	0.60000	358.91406	2.62316	4.01210
90.00000	0.70000	358.85449	2.62295	4.01277
100.00000	0.0	359.04053	2.62367	4.01069
100.00000	0.10000	359.04077	2.62368	4.01068
100.00000	0.20000	359.04224	2.62369	4.01067
100.00000	0.30000	359.04517	2.62371	4.01064
100.00000	0.40000	359.05005	2.62375	4.01058
100.00000	0.50000	359.05811	2.62381	4.01049
100.00000	0.60000	359.07349	2.62392	4.01032
100.00000	0.70000	359.10547	2.62415	4.00996
110.00000	0.0	359.11597	2.62401	4.00985
110.00000	0.10000	359.11792	2.62402	4.00982

S = 4.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.20000	359.12427	2.62406	4.00975
110.00000	0.30000	359.13623	2.62412	4.00962
110.00000	0.40000	359.15674	2.62423	4.00939
110.00000	0.50000	359.19214	2.62442	4.00899
110.00000	0.60000	359.25732	2.62477	4.00827
110.00000	0.70000	359.39502	2.62549	4.00673
120.00000	0.0	359.19751	2.62437	4.00894
120.00000	0.10000	359.20117	2.62439	4.00889
120.00000	0.20000	359.21265	2.62444	4.00877
120.00000	0.30000	359.23486	2.62455	4.00852
120.00000	0.40000	359.27246	2.62474	4.00810
120.00000	0.50000	359.33716	2.62506	4.00738
120.00000	0.60000	359.45630	2.62565	4.00605
120.00000	0.70000	359.70776	2.62690	4.00325
130.00000	0.0	359.28027	2.62472	4.00801
130.00000	0.10000	359.28564	2.62475	4.00795
130.00000	0.20000	359.30273	2.62483	4.00776
130.00000	0.30000	359.33472	2.62498	4.00740
130.00000	0.40000	359.38989	2.62525	4.00679
130.00000	0.50000	359.48437	2.62570	4.00574
130.00000	0.60000	359.65820	2.62654	4.00380
130.00000	0.70000	360.02490	2.62830	3.99972
140.00000	0.0	359.35864	2.62505	4.00714
140.00000	0.10000	359.36548	2.62508	4.00706
140.00000	0.20000	359.38770	2.62519	4.00681
140.00000	0.30000	359.42944	2.62538	4.00635
140.00000	0.40000	359.50073	2.62572	4.00555
140.00000	0.50000	359.62329	2.62630	4.00419
140.00000	0.60000	359.84888	2.62736	4.00168
140.00000	0.70000	360.32446	2.62961	3.99640
150.00000	0.0	359.42700	2.62533	4.00638
150.00000	0.10000	359.43530	2.62537	4.00628
150.00000	0.20000	359.45167	2.62549	4.00599
150.00000	0.30000	359.51172	2.62573	4.00543
150.00000	0.40000	359.59741	2.62612	4.00448
150.00000	0.50000	359.74463	2.62681	4.00284
150.00000	0.60000	360.01489	2.62807	3.99983
150.00000	0.70000	360.58496	2.63074	3.99351

S = 4.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	318.90625	2.42401	4.51543
0.0	0.10000	318.90161	2.42398	4.51550
0.0	0.20000	318.88745	2.42390	4.51570
0.0	0.30000	318.86035	2.42374	4.51608
0.0	0.40000	318.81396	2.42347	4.51674
0.0	0.50000	318.73437	2.42302	4.51787
0.0	0.60000	318.58765	2.42218	4.51995
10.00000	0.0	318.90552	2.42401	4.51544
10.00000	0.10000	318.90112	2.42399	4.51550
10.00000	0.20000	318.88672	2.42390	4.51571
10.00000	0.30000	318.85962	2.42375	4.51609
10.00000	0.40000	318.81323	2.42348	4.51675
10.00000	0.50000	318.73340	2.42303	4.51788
10.00000	0.60000	318.58594	2.42219	4.51997
20.00000	0.0	318.90430	2.42404	4.51546
20.00000	0.10000	318.89990	2.42401	4.51552
20.00000	0.20000	318.88525	2.42393	4.51573
20.00000	0.30000	318.85815	2.42377	4.51611
20.00000	0.40000	318.81152	2.42351	4.51678
20.00000	0.50000	318.73096	2.42306	4.51791
20.00000	0.60000	318.58301	2.42223	4.52001
30.00000	0.0	318.90430	2.42408	4.51546
30.00000	0.10000	318.89966	2.42406	4.51552
30.00000	0.20000	318.88525	2.42397	4.51573
30.00000	0.30000	318.85815	2.42383	4.51611
30.00000	0.40000	318.81128	2.42357	4.51678
30.00000	0.50000	318.73096	2.42313	4.51792
30.00000	0.60000	318.58276	2.42232	4.52002
40.00000	0.0	318.90796	2.42415	4.51541
40.00000	0.10000	318.90356	2.42413	4.51547
40.00000	0.20000	318.88940	2.42405	4.51567
40.00000	0.30000	318.86255	2.42391	4.51605
40.00000	0.40000	318.81641	2.42367	4.51670
40.00000	0.50000	318.73755	2.42324	4.51782
40.00000	0.60000	318.59180	2.42247	4.51989
50.00000	0.0	318.91870	2.42427	4.51526
50.00000	0.10000	318.91431	2.42424	4.51532
50.00000	0.20000	318.90088	2.42417	4.51551
50.00000	0.30000	318.87524	2.42404	4.51587
50.00000	0.40000	318.83179	2.42382	4.51649
50.00000	0.50000	318.75659	2.42343	4.51755
50.00000	0.60000	318.61792	2.42272	4.51952
60.00000	0.0	318.93945	2.42443	4.51496
60.00000	0.10000	318.93555	2.42441	4.51502
60.00000	0.20000	318.92334	2.42435	4.51519

S = 4.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
60.00000	0.30000	318.90039	2.42423	4.51551
60.00000	0.40000	318.86108	2.42404	4.51607
60.00000	0.50000	318.79346	2.42370	4.51703
60.00000	0.60000	318.66870	2.42308	4.51880
70.00000	0.0	318.97266	2.42464	4.51449
70.00000	0.10000	318.96973	2.42462	4.51453
70.00000	0.20000	318.95947	2.42458	4.51468
70.00000	0.30000	318.94067	2.42449	4.51494
70.00000	0.40000	318.90845	2.42433	4.51540
70.00000	0.50000	318.85278	2.42407	4.51619
70.00000	0.60000	318.75049	2.42358	4.51764
80.00000	0.0	319.02051	2.42491	4.51382
80.00000	0.10000	319.01831	2.42490	4.51385
80.00000	0.20000	319.01123	2.42487	4.51394
80.00000	0.30000	318.99829	2.42481	4.51413
80.00000	0.40000	318.97607	2.42472	4.51444
80.00000	0.50000	318.93774	2.42455	4.51499
80.00000	0.60000	318.86694	2.42423	4.51599
90.00000	0.0	319.08276	2.42524	4.51294
90.00000	0.10000	319.08179	2.42523	4.51295
90.00000	0.20000	319.07886	2.42522	4.51299
90.00000	0.30000	319.07349	2.42521	4.51307
90.00000	0.40000	319.06421	2.42518	4.51320
90.00000	0.50000	319.04834	2.42512	4.51342
90.00000	0.60000	319.01904	2.42502	4.51383
100.00000	0.0	319.15820	2.42561	4.51187
100.00000	0.10000	319.15869	2.42561	4.51186
100.00000	0.20000	319.16089	2.42563	4.51183
100.00000	0.30000	319.16455	2.42566	4.51178
100.00000	0.40000	319.17139	2.42570	4.51168
100.00000	0.50000	319.18262	2.42579	4.51152
100.00000	0.60000	319.20337	2.42593	4.51123
110.00000	0.0	319.24390	2.42601	4.51066
110.00000	0.10000	319.24634	2.42603	4.51062
110.00000	0.20000	319.25391	2.42607	4.51051
110.00000	0.30000	319.26831	2.42615	4.51031
110.00000	0.40000	319.29272	2.42628	4.50997
110.00000	0.50000	319.33521	2.42651	4.50937
110.00000	0.60000	319.41260	2.42694	4.50827
120.00000	0.0	319.33569	2.42643	4.50936
120.00000	0.10000	319.34009	2.42646	4.50930
120.00000	0.20000	319.35352	2.42653	4.50911
120.00000	0.30000	319.37915	2.42666	4.50875
120.00000	0.40000	319.42285	2.42688	4.50813
120.00000	0.50000	319.49805	2.42727	4.50707

S = 4.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
120.00000	0.60000	319.63647	2.42798	4.50512
130.00000	0.0	319.42822	2.42685	4.50805
130.00000	0.10000	319.43433	2.42688	4.50797
130.00000	0.20000	319.45361	2.42698	4.50769
130.00000	0.30000	319.49048	2.42716	4.50717
130.00000	0.40000	319.55371	2.42748	4.50628
130.00000	0.50000	319.66211	2.42802	4.50476
130.00000	0.60000	319.86133	2.42902	4.50195
140.00000	0.0	319.51489	2.42723	4.50683
140.00000	0.10000	319.52295	2.42727	4.50672
140.00000	0.20000	319.54810	2.42739	4.50636
140.00000	0.30000	319.59546	2.42762	4.50569
140.00000	0.40000	319.67676	2.42802	4.50455
140.00000	0.50000	319.81616	2.42871	4.50258
140.00000	0.60000	320.07251	2.42997	4.49898
150.00000	0.0	319.59033	2.42756	4.50577
150.00000	0.10000	319.59961	2.42760	4.50563
150.00000	0.20000	319.62964	2.42775	4.50521
150.00000	0.30000	319.68628	2.42802	4.50441
150.00000	0.40000	319.78345	2.42849	4.50305
150.00000	0.50000	319.94995	2.42930	4.50070
150.00000	0.60000	320.25562	2.43079	4.49641

S = 5.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	286.93970	2.25916	5.01847
0.0	0.10000	286.93433	2.25912	5.01857
0.0	0.20000	286.91650	2.25902	5.01888
0.0	0.30000	286.88281	2.25882	5.01947
0.0	0.40000	286.82520	2.25848	5.02048
0.0	0.50000	286.72607	2.25791	5.02221
0.0	0.60000	286.54321	2.25685	5.02542
10.00000	0.0	286.93994	2.25917	5.01847
10.00000	0.10000	286.93433	2.25914	5.01857
10.00000	0.20000	286.91650	2.25903	5.01888
10.00000	0.30000	286.88281	2.25883	5.01947
10.00000	0.40000	286.82520	2.25850	5.02048
10.00000	0.50000	286.72607	2.25792	5.02221
10.00000	0.60000	286.54346	2.25687	5.02541
20.00000	0.0	286.94067	2.25920	5.01846
20.00000	0.10000	286.93506	2.25917	5.01855
20.00000	0.20000	286.91748	2.25907	5.01886
20.00000	0.30000	286.88379	2.25887	5.01945
20.00000	0.40000	286.82642	2.25854	5.02046
20.00000	0.50000	286.72754	2.25798	5.02219
20.00000	0.60000	286.54541	2.25694	5.02538
30.00000	0.0	286.94385	2.25927	5.01840
30.00000	0.10000	286.93848	2.25924	5.01850
30.00000	0.20000	286.92090	2.25914	5.01880
30.00000	0.30000	286.88770	2.25895	5.01938
30.00000	0.40000	286.83105	2.25863	5.02037
30.00000	0.50000	286.73340	2.25808	5.02208
30.00000	0.60000	286.55347	2.25707	5.02524
40.00000	0.0	286.95239	2.25937	5.01825
40.00000	0.10000	286.94702	2.25934	5.01834
40.00000	0.20000	286.93018	2.25925	5.01864
40.00000	0.30000	286.89795	2.25907	5.01920
40.00000	0.40000	286.84302	2.25877	5.02016
40.00000	0.50000	286.74829	2.25825	5.02182
40.00000	0.60000	286.57422	2.25730	5.02488
50.00000	0.0	286.96899	2.25952	5.01796
50.00000	0.10000	286.96411	2.25949	5.01805
50.00000	0.20000	286.94824	2.25941	5.01833
50.00000	0.30000	286.91821	2.25925	5.01885
50.00000	0.40000	286.86670	2.25898	5.01975
50.00000	0.50000	286.77808	2.25850	5.02130
50.00000	0.60000	286.61499	2.25763	5.02416
60.00000	0.0	286.99707	2.25973	5.01747
60.00000	0.10000	286.99268	2.25970	5.01755
60.00000	0.20000	286.97852	2.25963	5.01779

S = 5.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
60.00000	0.30000	286.95190	2.25949	5.01826
60.00000	0.40000	286.90649	2.25926	5.01906
60.00000	0.50000	286.82812	2.25885	5.02043
60.00000	0.60000	286.68359	2.25811	5.02296
70.00000	0.0	287.03882	2.25999	5.01674
70.00000	0.10000	287.03540	2.25998	5.01680
70.00000	0.20000	287.02393	2.25992	5.01700
70.00000	0.30000	287.00244	2.25981	5.01738
70.00000	0.40000	286.96582	2.25963	5.01802
70.00000	0.50000	286.90259	2.25932	5.01912
70.00000	0.60000	286.78589	2.25874	5.02116
80.00000	0.0	287.09595	2.26032	5.01574
80.00000	0.10000	287.09351	2.26031	5.01578
80.00000	0.20000	287.08594	2.26028	5.01592
80.00000	0.30000	287.07153	2.26021	5.01617
80.00000	0.40000	287.04663	2.26010	5.01660
80.00000	0.50000	287.00415	2.25990	5.01735
80.00000	0.60000	286.92554	2.25953	5.01872
90.00000	0.0	287.16821	2.26071	5.01448
90.00000	0.10000	287.16748	2.26071	5.01449
90.00000	0.20000	287.16455	2.26070	5.01455
90.00000	0.30000	287.15894	2.26068	5.01464
90.00000	0.40000	287.14941	2.26065	5.01481
90.00000	0.50000	287.13281	2.26059	5.01510
90.00000	0.60000	287.10254	2.26048	5.01563
100.00000	0.0	287.25439	2.26116	5.01297
100.00000	0.10000	287.25537	2.26116	5.01296
100.00000	0.20000	287.25806	2.26118	5.01291
100.00000	0.30000	287.26294	2.26122	5.01283
100.00000	0.40000	287.27148	2.26128	5.01268
100.00000	0.50000	287.28589	2.26138	5.01243
100.00000	0.60000	287.31274	2.26157	5.01196
110.00000	0.0	287.35107	2.26163	5.01129
110.00000	0.10000	287.35376	2.26165	5.01124
110.00000	0.20000	287.36255	2.26170	5.01109
110.00000	0.30000	287.37939	2.26179	5.01080
110.00000	0.40000	287.40820	2.26195	5.01029
110.00000	0.50000	287.45752	2.26223	5.00943
110.00000	0.60000	287.54834	2.26274	5.00785
120.00000	0.0	287.45337	2.26212	5.00951
120.00000	0.10000	287.45825	2.26215	5.00942
120.00000	0.20000	287.47363	2.26223	5.00915
120.00000	0.30000	287.50293	2.26238	5.00864
120.00000	0.40000	287.55298	2.26265	5.00777
120.00000	0.50000	287.63916	2.26311	5.00627

S = 5.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
120.00000	0.60000	287.79712	2.26395	5.00352
130.00000	0.0	287.55542	2.26260	5.00773
130.00000	0.10000	287.56226	2.26263	5.00761
130.00000	0.20000	287.58447	2.26275	5.00722
130.00000	0.30000	287.62622	2.26296	5.00650
130.00000	0.40000	287.69751	2.26333	5.00526
130.00000	0.50000	287.82007	2.26397	5.00312
130.00000	0.60000	288.04565	2.26514	4.99921
140.00000	0.0	287.65088	2.26304	5.00607
140.00000	0.10000	287.65991	2.26308	5.00591
140.00000	0.20000	287.68799	2.26322	5.00542
140.00000	0.30000	287.74146	2.26350	5.00449
140.00000	0.40000	287.83276	2.26396	5.00290
140.00000	0.50000	287.98950	2.26476	5.00018
140.00000	0.60000	288.27783	2.26624	4.99518
150.00000	0.0	287.73340	2.26341	5.00463
150.00000	0.10000	287.74390	2.26346	5.00445
150.00000	0.20000	287.77759	2.26363	5.00386
150.00000	0.30000	287.84082	2.26395	5.00276
150.00000	0.40000	287.94946	2.26450	5.00087
150.00000	0.50000	288.13574	2.26544	4.99764
150.00000	0.60000	288.47803	2.26717	4.99171

S = 5.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	260.77319	2.11960	5.52204
0.0	0.10000	260.76660	2.11956	5.52218
0.0	0.20000	260.74512	2.11944	5.52263
0.0	0.30000	260.70459	2.11919	5.52349
0.0	0.40000	260.63501	2.11878	5.52496
0.0	0.50000	260.51538	2.11807	5.52750
0.0	0.60000	260.29492	2.11677	5.53218
10.00000	0.0	260.77393	2.11962	5.52202
10.00000	0.10000	260.76733	2.11958	5.52216
10.00000	0.20000	260.74585	2.11945	5.52262
10.00000	0.30000	260.70532	2.11921	5.52347
10.00000	0.40000	260.63623	2.11880	5.52494
10.00000	0.50000	260.51685	2.11809	5.52747
10.00000	0.60000	260.29687	2.11680	5.53214
20.00000	0.0	260.77686	2.11967	5.52196
20.00000	0.10000	260.77026	2.11963	5.52210
20.00000	0.20000	260.74902	2.11950	5.52255
20.00000	0.30000	260.70898	2.11927	5.52340
20.00000	0.40000	260.64038	2.11887	5.52485
20.00000	0.50000	260.52197	2.11817	5.52736
20.00000	0.60000	260.30396	2.11691	5.53199
30.00000	0.0	260.78394	2.11976	5.52181
30.00000	0.10000	260.77734	2.11972	5.52195
30.00000	0.20000	260.75659	2.11960	5.52239
30.00000	0.30000	260.71729	2.11937	5.52322
30.00000	0.40000	260.65015	2.11899	5.52464
30.00000	0.50000	260.53442	2.11832	5.52710
30.00000	0.60000	260.32104	2.11710	5.53163
40.00000	0.0	260.79712	2.11989	5.52153
40.00000	0.10000	260.79102	2.11986	5.52166
40.00000	0.20000	260.77124	2.11975	5.52208
40.00000	0.30000	260.73364	2.11953	5.52288
40.00000	0.40000	260.66919	2.11917	5.52424
40.00000	0.50000	260.55835	2.11855	5.52659
40.00000	0.60000	260.35400	2.11740	5.53093
50.00000	0.0	260.82031	2.12008	5.52104
50.00000	0.10000	260.81445	2.12005	5.52116
50.00000	0.20000	260.79614	2.11995	5.52155
50.00000	0.30000	260.76147	2.11976	5.52229
50.00000	0.40000	260.70190	2.11943	5.52355
50.00000	0.50000	260.59937	2.11887	5.52572
50.00000	0.60000	260.41040	2.11783	5.52973
60.00000	0.0	260.85596	2.12034	5.52028
60.00000	0.10000	260.85083	2.12031	5.52039
60.00000	0.20000	260.83496	2.12023	5.52073

S = 5.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
60.00000	0.30000	260.80444	2.12007	5.52137
60.00000	0.40000	260.75244	2.11979	5.52248
60.00000	0.50000	260.66284	2.11931	5.52437
60.00000	0.60000	260.49805	2.11843	5.52787
70.00000	0.0	260.90674	2.12066	5.51921
70.00000	0.10000	260.90259	2.12064	5.51930
70.00000	0.20000	260.88989	2.12058	5.51957
70.00000	0.30000	260.86572	2.12046	5.52008
70.00000	0.40000	260.82422	2.12024	5.52096
70.00000	0.50000	260.75317	2.11988	5.52246
70.00000	0.60000	260.62207	2.11920	5.52524
80.00000	0.0	260.97339	2.12106	5.51780
80.00000	0.10000	260.97070	2.12105	5.51786
80.00000	0.20000	260.96240	2.12101	5.51803
80.00000	0.30000	260.94653	2.12093	5.51837
80.00000	0.40000	260.91919	2.12080	5.51895
80.00000	0.50000	260.87231	2.12057	5.51994
80.00000	0.60000	260.78589	2.12015	5.52177
90.00000	0.0	261.05640	2.12152	5.51605
90.00000	0.10000	261.05542	2.12152	5.51607
90.00000	0.20000	261.05249	2.12151	5.51613
90.00000	0.30000	261.04663	2.12149	5.51625
90.00000	0.40000	261.03687	2.12145	5.51646
90.00000	0.50000	261.01978	2.12139	5.51682
90.00000	0.60000	260.98853	2.12127	5.51748
100.00000	0.0	261.15356	2.12204	5.51400
100.00000	0.10000	261.15454	2.12204	5.51397
100.00000	0.20000	261.15771	2.12207	5.51391
100.00000	0.30000	261.16382	2.12211	5.51378
100.00000	0.40000	261.17432	2.12218	5.51356
100.00000	0.50000	261.19238	2.12231	5.51318
100.00000	0.60000	261.22559	2.12254	5.51248
110.00000	0.0	261.26099	2.12259	5.51173
110.00000	0.10000	261.26440	2.12260	5.51166
110.00000	0.20000	261.27441	2.12266	5.51144
110.00000	0.30000	261.29370	2.12278	5.51104
110.00000	0.40000	261.32666	2.12297	5.51034
110.00000	0.50000	261.38330	2.12329	5.50915
110.00000	0.60000	261.48755	2.12389	5.50695
120.00000	0.0	261.37402	2.12315	5.50934
120.00000	0.10000	261.37939	2.12318	5.50923
120.00000	0.20000	261.39697	2.12327	5.50886
120.00000	0.30000	261.43018	2.12345	5.50816
120.00000	0.40000	261.48657	2.12377	5.50697
120.00000	0.50000	261.58374	2.12430	5.50493

S = 5.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
120.00000	0.60000	261.76245	2.12528	5.50117
130.00000	0.0	261.48608	2.12369	5.50698
130.00000	0.10000	261.49390	2.12373	5.50682
130.00000	0.20000	261.51855	2.12387	5.50630
130.00000	0.30000	261.56519	2.12411	5.50531
130.00000	0.40000	261.64526	2.12454	5.50363
130.00000	0.50000	261.78247	2.12528	5.50075
130.00000	0.60000	262.03467	2.12663	5.49545
140.00000	0.0	261.59033	2.12419	5.50479
140.00000	0.10000	261.60034	2.12424	5.50458
140.00000	0.20000	261.63184	2.12441	5.50392
140.00000	0.30000	261.69116	2.12472	5.50267
140.00000	0.40000	261.79272	2.12526	5.50053
140.00000	0.50000	261.96753	2.12618	5.49686
140.00000	0.60000	262.28809	2.12787	5.49015
150.00000	0.0	261.68018	2.12461	5.50290
150.00000	0.10000	261.69189	2.12467	5.50265
150.00000	0.20000	261.72900	2.12487	5.50187
150.00000	0.30000	261.79956	2.12523	5.50039
150.00000	0.40000	261.91968	2.12586	5.49786
150.00000	0.50000	262.12646	2.12694	5.49353
150.00000	0.60000	262.50562	2.12893	5.48559

S = 6.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	238.95624	1.99964	6.02621
0.0	0.10000	238.94826	1.99959	6.02641
0.0	0.20000	238.92300	1.99944	6.02705
0.0	0.30000	238.87526	1.99915	6.02825
0.0	0.40000	238.79340	1.99865	6.03032
0.0	0.50000	238.65251	1.99780	6.03388
0.0	0.60000	238.39249	1.99623	6.04046
10.00000	0.0	238.95775	1.99966	6.02617
10.00000	0.10000	238.94987	1.99961	6.02637
10.00000	0.20000	238.92474	1.99946	6.02700
10.00000	0.30000	238.87711	1.99917	6.02820
10.00000	0.40000	238.79562	1.99868	6.03026
10.00000	0.50000	238.65526	1.99783	6.03381
10.00000	0.60000	238.39626	1.99628	6.04036
20.00000	0.0	238.96297	1.99973	6.02604
20.00000	0.10000	238.95517	1.99968	6.02623
20.00000	0.20000	238.93037	1.99953	6.02686
20.00000	0.30000	238.88347	1.99925	6.02804
20.00000	0.40000	238.80310	1.99877	6.03007
20.00000	0.50000	238.66458	1.99794	6.03357
20.00000	0.60000	238.40916	1.99642	6.04004
30.00000	0.0	238.97366	1.99984	6.02577
30.00000	0.10000	238.96606	1.99979	6.02596
30.00000	0.20000	238.94202	1.99965	6.02657
30.00000	0.30000	238.89639	1.99938	6.02772
30.00000	0.40000	238.81825	1.99892	6.02969
30.00000	0.50000	238.68367	1.99813	6.03309
30.00000	0.60000	238.43544	1.99667	6.03937
40.00000	0.0	238.99236	2.00001	6.02530
40.00000	0.10000	238.98524	1.99997	6.02548
40.00000	0.20000	238.96228	1.99984	6.02606
40.00000	0.30000	238.91899	1.99958	6.02715
40.00000	0.40000	238.84477	1.99916	6.02902
40.00000	0.50000	238.71706	1.99842	6.03225
40.00000	0.60000	238.48149	1.99706	6.03820
50.00000	0.0	239.02213	2.00025	6.02455
50.00000	0.10000	239.01555	2.00021	6.02471
50.00000	0.20000	238.99455	2.00009	6.02524
50.00000	0.30000	238.95496	1.99987	6.02624
50.00000	0.40000	238.88705	1.99948	6.02795
50.00000	0.50000	238.77014	1.99882	6.03090
50.00000	0.60000	238.55458	1.99761	6.03635
60.00000	0.0	239.06580	2.00056	6.02345
60.00000	0.10000	239.06012	2.00052	6.02359
60.00000	0.20000	239.04199	2.00042	6.02405

S = 6.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
60.00000	0.30000	239.00775	2.00024	6.02491
60.00000	0.40000	238.94901	1.99991	6.02639
60.00000	0.50000	238.84802	1.99936	6.02894
60.00000	0.60000	238.66187	1.99833	6.03364
70.00000	0.0	239.12569	2.00094	6.02194
70.00000	0.10000	239.12115	2.00092	6.02205
70.00000	0.20000	239.10695	2.00084	6.02241
70.00000	0.30000	239.08006	2.00070	6.02309
70.00000	0.40000	239.03394	2.00046	6.02425
70.00000	0.50000	238.95468	2.00004	6.02625
70.00000	0.60000	238.80858	1.99926	6.02993
80.00000	0.0	239.20274	2.00141	6.02000
80.00000	0.10000	239.19983	2.00139	6.02007
80.00000	0.20000	239.19058	2.00135	6.02030
80.00000	0.30000	239.17319	2.00126	6.02074
80.00000	0.40000	239.14334	2.00111	6.02149
80.00000	0.50000	239.09189	2.00086	6.02279
80.00000	0.60000	238.99724	2.00038	6.02517
90.00000	0.0	239.29654	2.00194	6.01764
90.00000	0.10000	239.29562	2.00194	6.01766
90.00000	0.20000	239.29243	2.00193	6.01774
90.00000	0.30000	239.28644	2.00191	6.01789
90.00000	0.40000	239.27635	2.00187	6.01815
90.00000	0.50000	239.25880	2.00181	6.01859
90.00000	0.60000	239.22662	2.00168	6.01940
100.00000	0.0	239.40492	2.00254	6.01491
100.00000	0.10000	239.40611	2.00254	6.01488
100.00000	0.20000	239.40997	2.00257	6.01479
100.00000	0.30000	239.41734	2.00262	6.01460
100.00000	0.40000	239.42982	2.00271	6.01429
100.00000	0.50000	239.45140	2.00286	6.01375
100.00000	0.60000	239.49101	2.00313	6.01275
110.00000	0.0	239.52373	2.00316	6.01193
110.00000	0.10000	239.52733	2.00318	6.01184
110.00000	0.20000	239.53888	2.00325	6.01155
110.00000	0.30000	239.56078	2.00338	6.01100
110.00000	0.40000	239.59818	2.00360	6.01006
110.00000	0.50000	239.66249	2.00398	6.00845
110.00000	0.60000	239.78058	2.00468	6.00549
120.00000	0.0	239.64757	2.00380	6.00882
120.00000	0.10000	239.65366	2.00383	6.00867
120.00000	0.20000	239.67325	2.00395	6.00818
120.00000	0.30000	239.71024	2.00415	6.00725
120.00000	0.40000	239.77350	2.00451	6.00567
120.00000	0.50000	239.88210	2.00513	6.00295

S = 6.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
120.00000	0.60000	240.08180	2.00625	5.99796
130.00000	0.0	239.76973	2.00442	6.00576
130.00000	0.10000	239.77837	2.00446	6.00555
130.00000	0.20000	239.80576	2.00461	6.00486
130.00000	0.30000	239.85764	2.00490	6.00356
130.00000	0.40000	239.94633	2.00539	6.00134
130.00000	0.50000	240.09868	2.00623	5.99753
130.00000	0.60000	240.37840	2.00777	5.99055
140.00000	0.0	239.88298	2.00498	6.00293
140.00000	0.10000	239.89384	2.00503	6.00266
140.00000	0.20000	239.92860	2.00522	6.00179
140.00000	0.30000	239.99423	2.00558	6.00014
140.00000	0.40000	240.10655	2.00619	5.99734
140.00000	0.50000	240.29924	2.00724	5.99253
140.00000	0.60000	240.65289	2.00917	5.98372
150.00000	0.0	239.98012	2.00545	6.00050
150.00000	0.10000	239.99298	2.00552	6.00018
150.00000	0.20000	240.03395	2.00574	5.99915
150.00000	0.30000	240.11143	2.00616	5.99722
150.00000	0.40000	240.24385	2.00687	5.99391
150.00000	0.50000	240.47112	2.00809	5.98825
150.00000	0.60000	240.88805	2.01035	5.97788

S = 6.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	220.48442	1.89518	6.53107
0.0	0.10000	220.47523	1.89513	6.53135
0.0	0.20000	220.44598	1.89495	6.53221
0.0	0.30000	220.39076	1.89460	6.53385
0.0	0.40000	220.29601	1.89402	6.53666
0.0	0.50000	220.13286	1.89301	6.54150
10.00000	0.0	220.48674	1.89521	6.53100
10.00000	0.10000	220.47766	1.89515	6.53127
10.00000	0.20000	220.44856	1.89497	6.53214
10.00000	0.30000	220.39360	1.89464	6.53376
10.00000	0.40000	220.29935	1.89406	6.53656
10.00000	0.50000	220.13707	1.89306	6.54138
20.00000	0.0	220.49434	1.89529	6.53078
20.00000	0.10000	220.48544	1.89524	6.53104
20.00000	0.20000	220.45686	1.89506	6.53189
20.00000	0.30000	220.40283	1.89473	6.53349
20.00000	0.40000	220.31021	1.89417	6.53624
20.00000	0.50000	220.15077	1.89319	6.54097
30.00000	0.0	220.50905	1.89543	6.53034
30.00000	0.10000	220.50041	1.89538	6.53060
30.00000	0.20000	220.47276	1.89521	6.53142
30.00000	0.30000	220.42056	1.89490	6.53297
30.00000	0.40000	220.33112	1.89436	6.53562
30.00000	0.50000	220.17703	1.89343	6.54019
40.00000	0.0	220.53326	1.89564	6.52963
40.00000	0.10000	220.52515	1.89559	6.52987
40.00000	0.20000	220.49913	1.89544	6.53064
40.00000	0.30000	220.44991	1.89515	6.53210
40.00000	0.40000	220.36552	1.89465	6.53460
40.00000	0.50000	220.22035	1.89379	6.53891
50.00000	0.0	220.57008	1.89593	6.52854
50.00000	0.10000	220.56265	1.89588	6.52876
50.00000	0.20000	220.53903	1.89575	6.52946
50.00000	0.30000	220.49434	1.89549	6.53078
50.00000	0.40000	220.41772	1.89504	6.53305
50.00000	0.50000	220.28592	1.89428	6.53696
60.00000	0.0	220.62213	1.89629	6.52700
60.00000	0.10000	220.61578	1.89626	6.52718
60.00000	0.20000	220.59552	1.89614	6.52778
60.00000	0.30000	220.55724	1.89593	6.52892
60.00000	0.40000	220.49170	1.89556	6.53086
60.00000	0.50000	220.37877	1.89492	6.53420
70.00000	0.0	220.69147	1.89675	6.52495
70.00000	0.10000	220.68660	1.89672	6.52509
70.00000	0.20000	220.67082	1.89664	6.52556

S = 6.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
70.00000	0.30000	220.64113	1.89647	6.52643
70.00000	0.40000	220.59013	1.89620	6.52794
70.00000	0.50000	220.50249	1.89572	6.53054
80.00000	0.0	220.77911	1.89729	6.52236
80.00000	0.10000	220.77594	1.89727	6.52245
80.00000	0.20000	220.76595	1.89722	6.52275
80.00000	0.30000	220.74693	1.89712	6.52331
80.00000	0.40000	220.71440	1.89696	6.52427
80.00000	0.50000	220.65851	1.89667	6.52592
90.00000	0.0	220.88414	1.89790	6.51925
90.00000	0.10000	220.88310	1.89790	6.51929
90.00000	0.20000	220.87987	1.89789	6.51938
90.00000	0.30000	220.87379	1.89787	6.51956
90.00000	0.40000	220.86333	1.89783	6.51987
90.00000	0.50000	220.84537	1.89776	6.52040
100.00000	0.0	221.00398	1.89858	6.51572
100.00000	0.10000	221.00545	1.89859	6.51568
100.00000	0.20000	221.00996	1.89862	6.51554
100.00000	0.30000	221.01854	1.89868	6.51529
100.00000	0.40000	221.03326	1.89878	6.51486
100.00000	0.50000	221.05850	1.89896	6.51411
110.00000	0.0	221.13441	1.89929	6.51188
110.00000	0.10000	221.13844	1.89931	6.51176
110.00000	0.20000	221.15146	1.89939	6.51137
110.00000	0.30000	221.17595	1.89954	6.51065
110.00000	0.40000	221.21788	1.89979	6.50942
110.00000	0.50000	221.28995	1.90023	6.50730
120.00000	0.0	221.26932	1.90000	6.50791
120.00000	0.10000	221.27617	1.90004	6.50770
120.00000	0.20000	221.29784	1.90017	6.50707
120.00000	0.30000	221.33884	1.90040	6.50586
120.00000	0.40000	221.40894	1.90081	6.50380
120.00000	0.50000	221.52939	1.90151	6.50027
130.00000	0.0	221.40182	1.90069	6.50401
130.00000	0.10000	221.41135	1.90074	6.50373
130.00000	0.20000	221.44154	1.90092	6.50284
130.00000	0.30000	221.49864	1.90124	6.50117
130.00000	0.40000	221.59630	1.90179	6.49830
130.00000	0.50000	221.76401	1.90274	6.49339
140.00000	0.0	221.52415	1.90132	6.50042
140.00000	0.10000	221.53604	1.90138	6.50007
140.00000	0.20000	221.57414	1.90160	6.49895
140.00000	0.30000	221.64613	1.90200	6.49684
140.00000	0.40000	221.76921	1.90269	6.49324
140.00000	0.50000	221.98038	1.90387	6.48706

S = 6.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	221.62875	1.90184	6.49735
150.00000	0.10000	221.64278	1.90192	6.49694
150.00000	0.20000	221.68755	1.90217	6.49563
150.00000	0.30000	221.77231	1.90264	6.49315
150.00000	0.40000	221.91696	1.90344	6.48891
150.00000	0.50000	222.16527	1.90482	6.48166

S = 7.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	204.64059	1.80324	7.03673
0.0	0.10000	204.63013	1.80317	7.03709
0.0	0.20000	204.59683	1.80297	7.03823
0.0	0.30000	204.53375	1.80257	7.04040
0.0	0.40000	204.42574	1.80189	7.04412
0.0	0.50000	204.23956	1.80072	7.05054
10.00000	0.0	204.64383	1.80327	7.03662
10.00000	0.10000	204.63338	1.80321	7.03697
10.00000	0.20000	204.60036	1.80300	7.03811
10.00000	0.30000	204.53769	1.80261	7.04027
10.00000	0.40000	204.43027	1.80193	7.04397
10.00000	0.50000	204.24530	1.80078	7.05035
20.00000	0.0	204.65393	1.80337	7.03627
20.00000	0.10000	204.64383	1.80331	7.03662
20.00000	0.20000	204.61139	1.80311	7.03773
20.00000	0.30000	204.54994	1.80272	7.03985
20.00000	0.40000	204.44475	1.80207	7.04347
20.00000	0.50000	204.26353	1.80094	7.04972
30.00000	0.0	204.67285	1.80354	7.03562
30.00000	0.10000	204.66299	1.80348	7.03596
30.00000	0.20000	204.63185	1.80329	7.03703
30.00000	0.30000	204.57280	1.80293	7.03906
30.00000	0.40000	204.47153	1.80230	7.04255
30.00000	0.50000	204.29726	1.80123	7.04855
40.00000	0.0	204.70282	1.80379	7.03459
40.00000	0.10000	204.69366	1.80374	7.03490
40.00000	0.20000	204.66447	1.80356	7.03591
40.00000	0.30000	204.60909	1.80323	7.03781
40.00000	0.40000	204.51425	1.80265	7.04107
40.00000	0.50000	204.35092	1.80166	7.04670
50.00000	0.0	204.74690	1.80413	7.03307
50.00000	0.10000	204.73860	1.80408	7.03336
50.00000	0.20000	204.71222	1.80392	7.03426
50.00000	0.30000	204.66234	1.80363	7.03598
50.00000	0.40000	204.57681	1.80312	7.03892
50.00000	0.50000	204.42958	1.80225	7.04399
60.00000	0.0	204.80757	1.80456	7.03099
60.00000	0.10000	204.80055	1.80452	7.03123
60.00000	0.20000	204.77814	1.80439	7.03200
60.00000	0.30000	204.73576	1.80414	7.03346
60.00000	0.40000	204.66309	1.80372	7.03595
60.00000	0.50000	204.53793	1.80300	7.04026
70.00000	0.0	204.88692	1.80509	7.02827
70.00000	0.10000	204.88144	1.80506	7.02845
70.00000	0.20000	204.86423	1.80496	7.02905

S = 7.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
70.00000	0.30000	204.83156	1.80478	7.03017
70.00000	0.40000	204.77567	1.80446	7.03209
70.00000	0.50000	204.67937	1.80392	7.03539
80.00000	0.0	204.98535	1.80570	7.02489
80.00000	0.10000	204.98193	1.80569	7.02501
80.00000	0.20000	204.97108	1.80563	7.02538
80.00000	0.30000	204.95052	1.80552	7.02609
80.00000	0.40000	204.91525	1.80533	7.02730
80.00000	0.50000	204.85475	1.80501	7.02937
90.00000	0.0	205.10185	1.80640	7.02090
90.00000	0.10000	205.10083	1.80640	7.02094
90.00000	0.20000	205.09750	1.80639	7.02105
90.00000	0.30000	205.09123	1.80636	7.02127
90.00000	0.40000	205.08054	1.80632	7.02163
90.00000	0.50000	205.06213	1.80625	7.02226
100.00000	0.0	205.23360	1.80716	7.01639
100.00000	0.10000	205.23521	1.80717	7.01634
100.00000	0.20000	205.24043	1.80721	7.01616
100.00000	0.30000	205.25037	1.80728	7.01582
100.00000	0.40000	205.26723	1.80740	7.01525
100.00000	0.50000	205.29633	1.80760	7.01425
110.00000	0.0	205.37578	1.80796	7.01154
110.00000	0.10000	205.38029	1.80798	7.01138
110.00000	0.20000	205.39468	1.80807	7.01089
110.00000	0.30000	205.42198	1.80824	7.00996
110.00000	0.40000	205.46855	1.80853	7.00837
110.00000	0.50000	205.54866	1.80902	7.00564
120.00000	0.0	205.52206	1.80875	7.00655
120.00000	0.10000	205.52959	1.80880	7.00629
120.00000	0.20000	205.55339	1.80894	7.00548
120.00000	0.30000	205.59848	1.80921	7.00394
120.00000	0.40000	205.67561	1.80967	7.00132
120.00000	0.50000	205.80804	1.81045	6.99681
130.00000	0.0	205.66499	1.80952	7.00168
130.00000	0.10000	205.67535	1.80958	7.00132
130.00000	0.20000	205.70839	1.80977	7.00020
130.00000	0.30000	205.77087	1.81014	6.99807
130.00000	0.40000	205.87764	1.81076	6.99445
130.00000	0.50000	206.06096	1.81182	6.98822
140.00000	0.0	205.79648	1.81021	6.99720
140.00000	0.10000	205.80949	1.81029	6.99676
140.00000	0.20000	205.85100	1.81053	6.99535
140.00000	0.30000	205.92941	1.81098	6.99269
140.00000	0.40000	206.06346	1.81174	6.98814
140.00000	0.50000	206.29337	1.81306	6.98035

S = 7.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	205.90860	1.81080	6.99339
150.00000	0.10000	205.92384	1.81088	6.99288
150.00000	0.20000	205.97255	1.81116	6.99122
150.00000	0.30000	206.06456	1.81168	6.98810
150.00000	0.40000	206.22180	1.81258	6.98277
150.00000	0.50000	206.49142	1.81411	6.97365

S = 7.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	190.89899	1.72156	7.54326
0.0	0.10000	190.88719	1.72148	7.54372
0.0	0.20000	190.84970	1.72124	7.54520
0.0	0.30000	190.77856	1.72079	7.54802
0.0	0.40000	190.65677	1.72001	7.55284
0.0	0.50000	190.44672	1.71867	7.56117
10.00000	0.0	190.90303	1.72160	7.54310
10.00000	0.10000	190.89139	1.72152	7.54356
10.00000	0.20000	190.85406	1.72128	7.54503
10.00000	0.30000	190.78346	1.72083	7.54782
10.00000	0.40000	190.66251	1.72006	7.55261
10.00000	0.50000	190.45399	1.71873	7.56088
20.00000	0.0	190.91586	1.72171	7.54259
20.00000	0.10000	190.90440	1.72164	7.54304
20.00000	0.20000	190.86801	1.72141	7.54448
20.00000	0.30000	190.79893	1.72097	7.54721
20.00000	0.40000	190.68073	1.72022	7.55189
20.00000	0.50000	190.47691	1.71893	7.55997
30.00000	0.0	190.93907	1.72192	7.54167
30.00000	0.10000	190.92810	1.72185	7.54211
30.00000	0.20000	190.89317	1.72163	7.54349
30.00000	0.30000	190.82703	1.72121	7.54610
30.00000	0.40000	190.71378	1.72050	7.55058
30.00000	0.50000	190.51845	1.71928	7.55832
40.00000	0.0	190.97510	1.72221	7.54025
40.00000	0.10000	190.96490	1.72215	7.54065
40.00000	0.20000	190.93231	1.72194	7.54194
40.00000	0.30000	190.87067	1.72156	7.54438
40.00000	0.40000	190.76497	1.72091	7.54856
40.00000	0.50000	190.58289	1.71979	7.55577
50.00000	0.0	191.02670	1.72260	7.53821
50.00000	0.10000	191.01755	1.72255	7.53857
50.00000	0.20000	190.98836	1.72237	7.53973
50.00000	0.30000	190.93307	1.72203	7.54191
50.00000	0.40000	190.83841	1.72146	7.54565
50.00000	0.50000	190.67517	1.72047	7.55211
60.00000	0.0	191.09637	1.72310	7.53546
60.00000	0.10000	191.08868	1.72305	7.53577
60.00000	0.20000	191.06403	1.72291	7.53674
60.00000	0.30000	191.01730	1.72263	7.53858
60.00000	0.40000	190.93735	1.72215	7.54174
60.00000	0.50000	190.79971	1.72133	7.54718
70.00000	0.0	191.18584	1.72370	7.53194
70.00000	0.10000	191.17993	1.72366	7.53217
70.00000	0.20000	191.16110	1.72356	7.53291

S = 7.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
70.00000	0.30000	191.12550	1.72335	7.53432
70.00000	0.40000	191.06447	1.72300	7.53672
70.00000	0.50000	190.95935	1.72239	7.54087
80.00000	0.0	191.29549	1.72440	7.52762
80.00000	0.10000	191.29179	1.72438	7.52777
80.00000	0.20000	191.28008	1.72431	7.52823
80.00000	0.30000	191.25790	1.72419	7.52910
80.00000	0.40000	191.22000	1.72399	7.53059
80.00000	0.50000	191.15468	1.72363	7.53317
90.00000	0.0	191.42380	1.72518	7.52258
90.00000	0.10000	191.42278	1.72518	7.52262
90.00000	0.20000	191.41936	1.72517	7.52275
90.00000	0.30000	191.41302	1.72514	7.52300
90.00000	0.40000	191.40205	1.72510	7.52343
90.00000	0.50000	191.38313	1.72502	7.52417
100.00000	0.0	191.56769	1.72603	7.51692
100.00000	0.10000	191.56956	1.72605	7.51685
100.00000	0.20000	191.57547	1.72609	7.51662
100.00000	0.30000	191.58670	1.72617	7.51618
100.00000	0.40000	191.60585	1.72631	7.51543
100.00000	0.50000	191.63881	1.72654	7.51414
110.00000	0.0	191.72186	1.72692	7.51088
110.00000	0.10000	191.72690	1.72695	7.51068
110.00000	0.20000	191.74272	1.72705	7.51006
110.00000	0.30000	191.77277	1.72724	7.50889
110.00000	0.40000	191.82422	1.72756	7.50687
110.00000	0.50000	191.91246	1.72812	7.50342
120.00000	0.0	191.87968	1.72780	7.50470
120.00000	0.10000	191.88789	1.72785	7.50438
120.00000	0.20000	191.91393	1.72801	7.50336
120.00000	0.30000	191.96323	1.72831	7.50144
120.00000	0.40000	192.04747	1.72882	7.49815
120.00000	0.50000	192.19211	1.72970	7.49250
130.00000	0.0	192.03316	1.72865	7.49870
130.00000	0.10000	192.04446	1.72871	7.49826
130.00000	0.20000	192.08040	1.72893	7.49686
130.00000	0.30000	192.14827	1.72933	7.49421
130.00000	0.40000	192.26445	1.73002	7.48968
130.00000	0.50000	192.46364	1.73121	7.48193
140.00000	0.0	192.17395	1.72941	7.49321
140.00000	0.10000	192.18810	1.72949	7.49266
140.00000	0.20000	192.23303	1.72976	7.49091
140.00000	0.30000	192.31802	1.73026	7.48760
140.00000	0.40000	192.46320	1.73111	7.48195
140.00000	0.50000	192.71230	1.73258	7.47228

S = 7.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	192.29370	1.73005	7.48854
150.00000	0.10000	192.31024	1.73015	7.48790
150.00000	0.20000	192.36288	1.73046	7.48585
150.00000	0.30000	192.46233	1.73103	7.48198
150.00000	0.40000	192.63225	1.73203	7.47538
150.00000	0.50000	192.92352	1.73372	7.46410

S = 8.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	178.86508	1.64840	8.05076
0.0	0.10000	178.85188	1.64831	8.05135
0.0	0.20000	178.81004	1.64804	8.05324
0.0	0.30000	178.73061	1.64752	8.05682
0.0	0.40000	178.59450	1.64664	8.06296
0.0	0.50000	178.35980	1.64511	8.07357
10.00000	0.0	178.87004	1.64844	8.05054
10.00000	0.10000	178.85704	1.64836	8.05112
10.00000	0.20000	178.81543	1.64809	8.05300
10.00000	0.30000	178.73668	1.64758	8.05654
10.00000	0.40000	178.60162	1.64670	8.06264
10.00000	0.50000	178.36879	1.64519	8.07316
20.00000	0.0	178.88562	1.64858	8.04984
20.00000	0.10000	178.87286	1.64850	8.05041
20.00000	0.20000	178.83229	1.64824	8.05224
20.00000	0.30000	178.75542	1.64774	8.05570
20.00000	0.40000	178.62378	1.64689	8.06164
20.00000	0.50000	178.39661	1.64543	8.07190
30.00000	0.0	178.91325	1.64882	8.04859
30.00000	0.10000	178.90120	1.64874	8.04914
30.00000	0.20000	178.86241	1.64849	8.05088
30.00000	0.30000	178.78899	1.64802	8.05419
30.00000	0.40000	178.66324	1.64722	8.05986
30.00000	0.50000	178.44633	1.64584	8.06965
40.00000	0.0	178.95557	1.64916	8.04669
40.00000	0.10000	178.94426	1.64909	8.04720
40.00000	0.20000	178.90829	1.64886	8.04882
40.00000	0.30000	178.84018	1.64843	8.05188
40.00000	0.40000	178.72333	1.64769	8.05715
40.00000	0.50000	178.52202	1.64643	8.06623
50.00000	0.0	179.01495	1.64961	8.04402
50.00000	0.10000	179.00496	1.64955	8.04447
50.00000	0.20000	178.97285	1.64935	8.04591
50.00000	0.30000	178.91199	1.64897	8.04865
50.00000	0.40000	178.80789	1.64832	8.05334
50.00000	0.50000	178.62842	1.64721	8.06143
60.00000	0.0	179.09395	1.65017	8.04047
60.00000	0.10000	179.08548	1.65012	8.04085
60.00000	0.20000	179.05853	1.64996	8.04206
60.00000	0.30000	179.00752	1.64965	8.04435
60.00000	0.40000	178.92010	1.64912	8.04828
60.00000	0.50000	178.76956	1.64820	8.05506
70.00000	0.0	179.19394	1.65085	8.03599
70.00000	0.10000	179.18752	1.65082	8.03627
70.00000	0.20000	179.16705	1.65069	8.03719

S = 8.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
70.00000	0.30000	179.12837	1.65047	8.03893
70.00000	0.40000	179.06212	1.65007	8.04190
70.00000	0.50000	178.94801	1.64940	8.04703
80.00000	0.0	179.31497	1.65164	8.03056
80.00000	0.10000	179.31104	1.65162	8.03074
80.00000	0.20000	179.29845	1.65155	8.03130
80.00000	0.30000	179.27466	1.65141	8.03237
80.00000	0.40000	179.23392	1.65119	8.03419
80.00000	0.50000	179.16380	1.65079	8.03734
90.00000	0.0	179.45544	1.65252	8.02428
90.00000	0.10000	179.45433	1.65251	8.02433
90.00000	0.20000	179.45090	1.65250	8.02448
90.00000	0.30000	179.44431	1.65247	8.02477
90.00000	0.40000	179.43318	1.65243	8.02527
90.00000	0.50000	179.41393	1.65235	8.02613
100.00000	0.0	179.61165	1.65346	8.01730
100.00000	0.10000	179.61378	1.65348	8.01720
100.00000	0.20000	179.62039	1.65352	8.01691
100.00000	0.30000	179.63297	1.65361	8.01635
100.00000	0.40000	179.65454	1.65377	8.01538
100.00000	0.50000	179.69151	1.65403	8.01373
110.00000	0.0	179.77814	1.65444	8.00987
110.00000	0.10000	179.78362	1.65447	8.00963
110.00000	0.20000	179.80099	1.65459	8.00885
110.00000	0.30000	179.83388	1.65480	8.00739
110.00000	0.40000	179.89017	1.65516	8.00488
110.00000	0.50000	179.98682	1.65578	8.00059
120.00000	0.0	179.94760	1.65541	8.00233
120.00000	0.10000	179.95653	1.65547	8.00193
120.00000	0.20000	179.98485	1.65564	8.00067
120.00000	0.30000	180.03835	1.65598	7.99830
120.00000	0.40000	180.12987	1.65654	7.99423
120.00000	0.50000	180.28702	1.65752	7.98726
130.00000	0.0	180.11188	1.65634	7.99503
130.00000	0.10000	180.12404	1.65641	7.99449
130.00000	0.20000	180.16298	1.65665	7.99276
130.00000	0.30000	180.23642	1.65710	7.98951
130.00000	0.40000	180.36192	1.65786	7.98395
130.00000	0.50000	180.57727	1.65917	7.97443
140.00000	0.0	180.26201	1.65718	7.98837
140.00000	0.10000	180.27724	1.65727	7.98770
140.00000	0.20000	180.32571	1.65756	7.98555
140.00000	0.30000	180.41736	1.65811	7.98149
140.00000	0.40000	180.57391	1.65905	7.97457
140.00000	0.50000	180.84227	1.66066	7.96274

S = 8.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
150.00000	0.0	180.38948	1.65788	7.98273
150.00000	0.10000	180.40727	1.65798	7.98194
150.00000	0.20000	180.46394	1.65832	7.97943
150.00000	0.30000	180.57094	1.65896	7.97470
150.00000	0.40000	180.75368	1.66005	7.96664
150.00000	0.50000	181.06689	1.66192	7.95286

S = 8.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	168.23726	1.58241	8.55934
0.0	0.10000	168.22269	1.58231	8.56008
0.0	0.20000	168.17622	1.58201	8.56245
0.0	0.30000	168.08830	1.58142	8.56693
0.0	0.40000	167.93750	1.58043	8.57462
10.00000	0.0	168.24316	1.58246	8.55904
10.00000	0.10000	168.22868	1.58237	8.55978
10.00000	0.20000	168.18263	1.58206	8.56212
10.00000	0.30000	168.09549	1.58149	8.56656
10.00000	0.40000	167.94595	1.58050	8.57419
20.00000	0.0	168.26155	1.58262	8.55810
20.00000	0.10000	168.24744	1.58253	8.55882
20.00000	0.20000	168.20265	1.58224	8.56110
20.00000	0.30000	168.11775	1.58168	8.56542
20.00000	0.40000	167.97215	1.58072	8.57285
30.00000	0.0	168.29391	1.58290	8.55646
30.00000	0.10000	168.28056	1.58281	8.55714
30.00000	0.20000	168.23785	1.58253	8.55931
30.00000	0.30000	168.15695	1.58200	8.56343
30.00000	0.40000	168.01830	1.58110	8.57049
40.00000	0.0	168.34261	1.58328	8.55398
40.00000	0.10000	168.33020	1.58320	8.55461
40.00000	0.20000	168.29065	1.58295	8.55662
40.00000	0.30000	168.21585	1.58247	8.56043
40.00000	0.40000	168.08762	1.58165	8.56696
50.00000	0.0	168.41006	1.58380	8.55056
50.00000	0.10000	168.39911	1.58373	8.55111
50.00000	0.20000	168.36401	1.58350	8.55290
50.00000	0.30000	168.29759	1.58308	8.55627
50.00000	0.40000	168.18365	1.58236	8.56207
60.00000	0.0	168.49857	1.58443	8.54607
60.00000	0.10000	168.48941	1.58438	8.54653
60.00000	0.20000	168.46014	1.58420	8.54802
60.00000	0.30000	168.40459	1.58385	8.55084
60.00000	0.40000	168.30959	1.58326	8.55566
70.00000	0.0	168.60933	1.58520	8.54045
70.00000	0.10000	168.60240	1.58515	8.54080
70.00000	0.20000	168.58032	1.58502	8.54192
70.00000	0.30000	168.53856	1.58477	8.54404
70.00000	0.40000	168.46690	1.58434	8.54767
80.00000	0.0	168.74217	1.58607	8.53373
80.00000	0.10000	168.73790	1.58605	8.53395
80.00000	0.20000	168.72447	1.58597	8.53462
80.00000	0.30000	168.69904	1.58583	8.53591
80.00000	0.40000	168.65547	1.58558	8.53812

S = 8.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
90.00000	0.0	168.89497	1.58705	8.52601
90.00000	0.10000	168.89384	1.58704	8.52606
90.00000	0.20000	168.89035	1.58703	8.52624
90.00000	0.30000	168.88367	1.58700	8.52658
90.00000	0.40000	168.87228	1.58696	8.52715
100.00000	0.0	169.06386	1.58809	8.51749
100.00000	0.10000	169.06616	1.58810	8.51737
100.00000	0.20000	169.07353	1.58816	8.51700
100.00000	0.30000	169.08755	1.58826	8.51630
100.00000	0.40000	169.11154	1.58843	8.51509
110.00000	0.0	169.24274	1.58916	8.50849
110.00000	0.10000	169.24873	1.58920	8.50819
110.00000	0.20000	169.26765	1.58933	8.50724
110.00000	0.30000	169.30345	1.58956	8.50544
110.00000	0.40000	169.36473	1.58996	8.50236
120.00000	0.0	169.42413	1.59023	8.49938
120.00000	0.10000	169.43372	1.59029	8.49890
120.00000	0.20000	169.46437	1.59048	8.49736
120.00000	0.30000	169.52223	1.59085	8.49446
120.00000	0.40000	169.62117	1.59148	8.48951
130.00000	0.0	169.59926	1.59124	8.49060
130.00000	0.10000	169.61235	1.59132	8.48995
130.00000	0.20000	169.65421	1.59158	8.48785
130.00000	0.30000	169.73331	1.59208	8.48390
130.00000	0.40000	169.86845	1.59291	8.47715
140.00000	0.0	169.75890	1.59215	8.48262
140.00000	0.10000	169.77524	1.59225	8.48180
140.00000	0.20000	169.82729	1.59257	8.47920
140.00000	0.30000	169.92572	1.59318	8.47429
140.00000	0.40000	170.09367	1.59421	8.46592
150.00000	0.0	169.89413	1.59292	8.47587
150.00000	0.10000	169.91322	1.59303	8.47491
150.00000	0.20000	169.97392	1.59340	8.47189
150.00000	0.30000	170.08853	1.59410	8.46618
150.00000	0.40000	170.28438	1.59529	8.45644

S = 9.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	158.78081	1.52252	9.06911
0.0	0.10000	158.76479	1.52241	9.07002
0.0	0.20000	158.71378	1.52207	9.07294
0.0	0.30000	158.61705	1.52142	9.07847
0.0	0.40000	158.45110	1.52030	9.08798
10.00000	0.0	158.78773	1.52258	9.06871
10.00000	0.10000	158.77190	1.52247	9.06961
10.00000	0.20000	158.72131	1.52213	9.07250
10.00000	0.30000	158.62544	1.52149	9.07799
10.00000	0.40000	158.46094	1.52039	9.08741
20.00000	0.0	158.80905	1.52276	9.06749
20.00000	0.10000	158.79364	1.52266	9.06837
20.00000	0.20000	158.74443	1.52233	9.07118
20.00000	0.30000	158.65120	1.52171	9.07651
20.00000	0.40000	158.49132	1.52064	9.08567
30.00000	0.0	158.84628	1.52307	9.06537
30.00000	0.10000	158.83165	1.52297	9.06620
30.00000	0.20000	158.78482	1.52266	9.06888
30.00000	0.30000	158.69632	1.52208	9.07393
30.00000	0.40000	158.54439	1.52107	9.08263
40.00000	0.0	158.90158	1.52351	9.06221
40.00000	0.10000	158.88805	1.52342	9.06298
40.00000	0.20000	158.84499	1.52314	9.06544
40.00000	0.30000	158.76326	1.52260	9.07011
40.00000	0.40000	158.62323	1.52169	9.07812
50.00000	0.0	158.97742	1.52409	9.05789
50.00000	0.10000	158.96552	1.52401	9.05857
50.00000	0.20000	158.92735	1.52376	9.06074
50.00000	0.30000	158.85510	1.52330	9.06486
50.00000	0.40000	158.73125	1.52250	9.07194
60.00000	0.0	159.07576	1.52480	9.05229
60.00000	0.10000	159.06584	1.52474	9.05285
60.00000	0.20000	159.03407	1.52454	9.05466
60.00000	0.30000	158.97400	1.52416	9.05808
60.00000	0.40000	158.87109	1.52351	9.06395
70.00000	0.0	159.19757	1.52565	9.04536
70.00000	0.10000	159.19012	1.52561	9.04579
70.00000	0.20000	159.16634	1.52546	9.04714
70.00000	0.30000	159.12140	1.52518	9.04969
70.00000	0.40000	159.04427	1.52471	9.05408
80.00000	0.0	159.34241	1.52662	9.03714
80.00000	0.10000	159.33786	1.52660	9.03740
80.00000	0.20000	159.32358	1.52651	9.03821
80.00000	0.30000	159.29643	1.52635	9.03975
80.00000	0.40000	159.24995	1.52608	9.04239

S = 9.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
90.00000	0.0	159.50786	1.52770	9.02777
90.00000	0.10000	159.50674	1.52769	9.02783
90.00000	0.20000	159.50316	1.52768	9.02803
90.00000	0.30000	159.49629	1.52765	9.02842
90.00000	0.40000	159.48465	1.52760	9.02908
100.00000	0.0	159.68959	1.52884	9.01749
100.00000	0.10000	159.69215	1.52886	9.01735
100.00000	0.20000	159.70027	1.52892	9.01689
100.00000	0.30000	159.71568	1.52903	9.01602
100.00000	0.40000	159.74213	1.52922	9.01453
110.00000	0.0	159.88115	1.53001	9.00669
110.00000	0.10000	159.88756	1.53006	9.00633
110.00000	0.20000	159.90810	1.53019	9.00517
110.00000	0.30000	159.94687	1.53045	9.00299
110.00000	0.40000	160.01321	1.53089	8.99926
120.00000	0.0	160.07458	1.53118	8.99581
120.00000	0.10000	160.08485	1.53124	8.99523
120.00000	0.20000	160.11783	1.53146	8.99338
120.00000	0.30000	160.18013	1.53186	8.98988
120.00000	0.40000	160.28653	1.53254	8.98391
130.00000	0.0	160.26068	1.53228	8.98536
130.00000	0.10000	160.27480	1.53237	8.98457
130.00000	0.20000	160.31966	1.53265	8.98205
130.00000	0.30000	160.40450	1.53319	8.97730
130.00000	0.40000	160.54930	1.53411	8.96921
140.00000	0.0	160.42990	1.53327	8.97588
140.00000	0.10000	160.44737	1.53337	8.97491
140.00000	0.20000	160.50310	1.53372	8.97179
140.00000	0.30000	160.60829	1.53438	8.96591
140.00000	0.40000	160.78795	1.53551	8.95589
150.00000	0.0	160.57303	1.53409	8.96788
150.00000	0.10000	160.59331	1.53422	8.96675
150.00000	0.20000	160.65811	1.53462	8.96313
150.00000	0.30000	160.78050	1.53538	8.95631
150.00000	0.40000	160.98946	1.53668	8.94468

S = 9.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	150.31070	1.46785	9.58016
0.0	0.10000	150.29314	1.46773	9.58127
0.0	0.20000	150.23734	1.46735	9.58483
0.0	0.30000	150.13153	1.46663	9.59159
0.0	0.40000	149.95007	1.46539	9.60320
10.00000	0.0	150.31865	1.46792	9.57965
10.00000	0.10000	150.30127	1.46780	9.58076
10.00000	0.20000	150.24597	1.46743	9.58428
10.00000	0.30000	150.14120	1.46671	9.59097
10.00000	0.40000	149.96138	1.46549	9.60247
20.00000	0.0	150.34296	1.46813	9.57810
20.00000	0.10000	150.32610	1.46801	9.57917
20.00000	0.20000	150.27243	1.46765	9.58260
20.00000	0.30000	150.17065	1.46696	9.58909
20.00000	0.40000	149.99611	1.46578	9.60025
30.00000	0.0	150.38515	1.46848	9.57541
30.00000	0.10000	150.36914	1.46837	9.57643
30.00000	0.20000	150.31831	1.46803	9.57967
30.00000	0.30000	150.22183	1.46738	9.58582
30.00000	0.40000	150.05629	1.46626	9.59640
40.00000	0.0	150.44730	1.46897	9.57146
40.00000	0.10000	150.43266	1.46887	9.57239
40.00000	0.20000	150.38585	1.46856	9.57537
40.00000	0.30000	150.29707	1.46797	9.58102
40.00000	0.40000	150.14496	1.46696	9.59073
50.00000	0.0	150.53169	1.46962	9.56609
50.00000	0.10000	150.51877	1.46953	9.56691
50.00000	0.20000	150.47752	1.46926	9.56954
50.00000	0.30000	150.39928	1.46875	9.57451
50.00000	0.40000	150.26523	1.46787	9.58305
60.00000	0.0	150.64006	1.47041	9.55921
60.00000	0.10000	150.62936	1.47034	9.55989
60.00000	0.20000	150.59521	1.47012	9.56206
60.00000	0.30000	150.53050	1.46971	9.56617
60.00000	0.40000	150.41957	1.46899	9.57322
70.00000	0.0	150.77325	1.47135	9.55077
70.00000	0.10000	150.76529	1.47130	9.55127
70.00000	0.20000	150.73978	1.47114	9.55289
70.00000	0.30000	150.69150	1.47084	9.55595
70.00000	0.40000	150.60892	1.47032	9.56119
80.00000	0.0	150.93033	1.47242	9.54083
80.00000	0.10000	150.92561	1.47239	9.54112
80.00000	0.20000	150.91039	1.47230	9.54209
80.00000	0.30000	150.88153	1.47213	9.54391
80.00000	0.40000	150.83205	1.47183	9.54704

S = 9.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
90.00000	0.0	151.10870	1.47360	9.52956
90.00000	0.10000	151.10759	1.47359	9.52963
90.00000	0.20000	151.10391	1.47358	9.52987
90.00000	0.30000	151.09697	1.47355	9.53030
90.00000	0.40000	151.08507	1.47350	9.53105
100.00000	0.0	151.30351	1.47485	9.51729
100.00000	0.10000	151.30634	1.47487	9.51712
100.00000	0.20000	151.31525	1.47493	9.51656
100.00000	0.30000	151.33220	1.47506	9.51549
100.00000	0.40000	151.36105	1.47527	9.51368
110.00000	0.0	151.50793	1.47613	9.50445
110.00000	0.10000	151.51486	1.47617	9.50402
110.00000	0.20000	151.53703	1.47632	9.50263
110.00000	0.30000	151.57880	1.47660	9.50001
110.00000	0.40000	151.65028	1.47709	9.49553
120.00000	0.0	151.71353	1.47739	9.49157
120.00000	0.10000	151.72466	1.47746	9.49088
120.00000	0.20000	151.75993	1.47769	9.48867
120.00000	0.30000	151.82669	1.47813	9.48450
120.00000	0.40000	151.94078	1.47888	9.47738
130.00000	0.0	151.91083	1.47858	9.47925
130.00000	0.10000	151.92589	1.47868	9.47830
130.00000	0.20000	151.97383	1.47899	9.47532
130.00000	0.30000	152.06439	1.47957	9.46967
130.00000	0.40000	152.21907	1.48057	9.46005
140.00000	0.0	152.08972	1.47964	9.46809
140.00000	0.10000	152.10838	1.47976	9.46693
140.00000	0.20000	152.16771	1.48014	9.46324
140.00000	0.30000	152.27983	1.48086	9.45627
140.00000	0.40000	152.47115	1.48208	9.44441
150.00000	0.0	152.24072	1.48053	9.45870
150.00000	0.10000	152.26230	1.48067	9.45736
150.00000	0.20000	152.33128	1.48111	9.45308
150.00000	0.30000	152.46146	1.48193	9.44501
150.00000	0.40000	152.68369	1.48334	9.43126

S = 10.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	142.67863	1.41771	10.09261
0.0	0.10000	142.65965	1.41758	10.09395
0.0	0.20000	142.59895	1.41716	10.09825
0.0	0.30000	142.48384	1.41636	10.10641
0.0	0.40000	142.28627	1.41499	10.12044
10.00000	0.0	142.68764	1.41779	10.09197
10.00000	0.10000	142.66879	1.41766	10.09331
10.00000	0.20000	142.60872	1.41724	10.09756
10.00000	0.30000	142.49471	1.41645	10.10564
10.00000	0.40000	142.29910	1.41510	10.11953
20.00000	0.0	142.71510	1.41802	10.09003
20.00000	0.10000	142.69688	1.41789	10.09132
20.00000	0.20000	142.63850	1.41749	10.09545
20.00000	0.30000	142.52800	1.41673	10.10328
20.00000	0.40000	142.33839	1.41543	10.11674
30.00000	0.0	142.76244	1.41841	10.08669
30.00000	0.10000	142.74515	1.41829	10.08791
30.00000	0.20000	142.68994	1.41791	10.09181
30.00000	0.30000	142.58543	1.41720	10.09921
30.00000	0.40000	142.40593	1.41597	10.11194
40.00000	0.0	142.83170	1.41896	10.08180
40.00000	0.10000	142.81578	1.41885	10.08292
40.00000	0.20000	142.76518	1.41851	10.08649
40.00000	0.30000	142.66931	1.41786	10.09327
40.00000	0.40000	142.50471	1.41675	10.10493
50.00000	0.0	142.92482	1.41968	10.07523
50.00000	0.10000	142.91087	1.41958	10.07621
50.00000	0.20000	142.86646	1.41929	10.07934
50.00000	0.30000	142.78214	1.41873	10.08529
50.00000	0.40000	142.63763	1.41776	10.09551
60.00000	0.0	143.04355	1.42056	10.06686
60.00000	0.10000	143.03207	1.42048	10.06767
60.00000	0.20000	142.99535	1.42024	10.07026
60.00000	0.30000	142.92584	1.41978	10.07515
60.00000	0.40000	142.80670	1.41900	10.08356
70.00000	0.0	143.18828	1.42159	10.05669
70.00000	0.10000	143.17981	1.42154	10.05728
70.00000	0.20000	143.15259	1.42136	10.05920
70.00000	0.30000	143.10098	1.42103	10.06282
70.00000	0.40000	143.01273	1.42046	10.06903
80.00000	0.0	143.35803	1.42276	10.04478
80.00000	0.10000	143.35289	1.42273	10.04514
80.00000	0.20000	143.33679	1.42263	10.04627
80.00000	0.30000	143.30615	1.42245	10.04842
80.00000	0.40000	143.25377	1.42212	10.05209

S = 10.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
90.00000	0.0	143.54951	1.42405	10.03138
90.00000	0.10000	143.54831	1.42404	10.03147
90.00000	0.20000	143.54463	1.42403	10.03172
90.00000	0.30000	143.53752	1.42400	10.03222
90.00000	0.40000	143.52545	1.42394	10.03306
100.00000	0.0	143.75758	1.42540	10.01686
100.00000	0.10000	143.76059	1.42543	10.01665
100.00000	0.20000	143.77034	1.42550	10.01597
100.00000	0.30000	143.78874	1.42564	10.01469
100.00000	0.40000	143.82025	1.42587	10.01250
110.00000	0.0	143.97501	1.42679	10.00174
110.00000	0.10000	143.98245	1.42684	10.00122
110.00000	0.20000	144.00624	1.42701	9.99957
110.00000	0.30000	144.05110	1.42731	9.99645
110.00000	0.40000	144.12788	1.42784	9.99113
120.00000	0.0	144.19302	1.42816	9.98661
120.00000	0.10000	144.20483	1.42823	9.98580
120.00000	0.20000	144.24258	1.42849	9.98318
120.00000	0.30000	144.31389	1.42896	9.97825
120.00000	0.40000	144.43568	1.42977	9.96984
130.00000	0.0	144.40154	1.42944	9.97219
130.00000	0.10000	144.41754	1.42954	9.97109
130.00000	0.20000	144.46855	1.42988	9.96757
130.00000	0.30000	144.56502	1.43051	9.96092
130.00000	0.40000	144.72961	1.43159	9.94959
140.00000	0.0	144.59018	1.43059	9.95918
140.00000	0.10000	144.60995	1.43071	9.95782
140.00000	0.20000	144.67296	1.43112	9.95348
140.00000	0.30000	144.79211	1.43190	9.94529
140.00000	0.40000	144.99524	1.43321	9.93136
150.00000	0.0	144.74905	1.43154	9.94825
150.00000	0.10000	144.77200	1.43169	9.94667
150.00000	0.20000	144.84517	1.43216	9.94165
150.00000	0.30000	144.98325	1.43305	9.93218
150.00000	0.40000	145.21872	1.43457	9.91608

S = 10.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	135.76494	1.37151	10.60657
0.0	0.10000	135.74431	1.37136	10.60818
0.0	0.20000	135.67856	1.37090	10.61332
0.0	0.30000	135.55394	1.37003	10.62308
10.00000	0.0	135.77495	1.37159	10.60579
10.00000	0.10000	135.75458	1.37145	10.60738
10.00000	0.20000	135.68944	1.37099	10.61247
10.00000	0.30000	135.56609	1.37013	10.62212
20.00000	0.0	135.80560	1.37185	10.60339
20.00000	0.10000	135.78590	1.37171	10.60493
20.00000	0.20000	135.72282	1.37127	10.60986
20.00000	0.30000	135.60332	1.37044	10.61921
30.00000	0.0	135.85823	1.37228	10.59928
30.00000	0.10000	135.83957	1.37216	10.60074
30.00000	0.20000	135.78000	1.37174	10.60539
30.00000	0.30000	135.66708	1.37096	10.61422
40.00000	0.0	135.93466	1.37290	10.59332
40.00000	0.10000	135.91763	1.37278	10.59465
40.00000	0.20000	135.86311	1.37241	10.59890
40.00000	0.30000	135.75980	1.37170	10.60697
50.00000	0.0	136.03687	1.37369	10.58537
50.00000	0.10000	136.02190	1.37359	10.58653
50.00000	0.20000	135.97414	1.37326	10.59025
50.00000	0.30000	135.88365	1.37265	10.59730
60.00000	0.0	136.16620	1.37465	10.57531
60.00000	0.10000	136.15387	1.37457	10.57627
60.00000	0.20000	136.11459	1.37431	10.57932
60.00000	0.30000	136.04021	1.37381	10.58510
70.00000	0.0	136.32285	1.37579	10.56316
70.00000	0.10000	136.31369	1.37573	10.56387
70.00000	0.20000	136.28467	1.37554	10.56612
70.00000	0.30000	136.22980	1.37518	10.57037
80.00000	0.0	136.50526	1.37706	10.54904
80.00000	0.10000	136.49995	1.37703	10.54945
80.00000	0.20000	136.48282	1.37693	10.55078
80.00000	0.30000	136.45047	1.37672	10.55328
90.00000	0.0	136.71017	1.37846	10.53323
90.00000	0.10000	136.70897	1.37846	10.53332
90.00000	0.20000	136.70522	1.37844	10.53361
90.00000	0.30000	136.69801	1.37841	10.53417
100.00000	0.0	136.93178	1.37993	10.51618
100.00000	0.10000	136.93503	1.37996	10.51593
100.00000	0.20000	136.94557	1.38003	10.51513
100.00000	0.30000	136.96550	1.38019	10.51360
110.00000	0.0	137.16248	1.38143	10.49850

S = 10.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.10000	137.17043	1.38148	10.49789
110.00000	0.20000	137.19576	1.38166	10.49595
110.00000	0.30000	137.24377	1.38199	10.49228
120.00000	0.0	137.39288	1.38290	10.48089
120.00000	0.10000	137.40547	1.38298	10.47993
120.00000	0.20000	137.44562	1.38325	10.47687
120.00000	0.30000	137.52155	1.38377	10.47109
130.00000	0.0	137.61270	1.38428	10.46415
130.00000	0.10000	137.62975	1.38439	10.46285
130.00000	0.20000	137.68391	1.38475	10.45874
130.00000	0.30000	137.78621	1.38543	10.45097
140.00000	0.0	137.81120	1.38551	10.44908
140.00000	0.10000	137.83217	1.38564	10.44749
140.00000	0.20000	137.89894	1.38608	10.44243
140.00000	0.30000	138.02510	1.38692	10.43288
150.00000	0.0	137.97810	1.38653	10.43644
150.00000	0.10000	138.00233	1.38669	10.43461
150.00000	0.20000	138.07971	1.38719	10.42876
150.00000	0.30000	138.22575	1.38815	10.41774

S = 11.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	129.47102	1.32876	11.12218
0.0	0.10000	129.44885	1.32860	11.12408
0.0	0.20000	129.37790	1.32810	11.13019
0.0	0.30000	129.24352	1.32714	11.14176
10.00000	0.0	129.48224	1.32886	11.12122
10.00000	0.10000	129.46024	1.32870	11.12311
10.00000	0.20000	129.39005	1.32820	11.12914
10.00000	0.30000	129.25703	1.32726	11.14059
20.00000	0.0	129.51622	1.32914	11.11830
20.00000	0.10000	129.49490	1.32899	11.12013
20.00000	0.20000	129.42702	1.32851	11.12596
20.00000	0.30000	129.29828	1.32760	11.13704
30.00000	0.0	129.57425	1.32962	11.11332
30.00000	0.10000	129.55414	1.32948	11.11504
30.00000	0.20000	129.49011	1.32903	11.12054
30.00000	0.30000	129.36874	1.32818	11.13097
40.00000	0.0	129.65813	1.33029	11.10613
40.00000	0.10000	129.63982	1.33017	11.10770
40.00000	0.20000	129.58127	1.32976	11.11272
40.00000	0.30000	129.47050	1.32899	11.12222
50.00000	0.0	129.76958	1.33116	11.09659
50.00000	0.10000	129.75357	1.33105	11.09796
50.00000	0.20000	129.70239	1.33070	11.10234
50.00000	0.30000	129.60558	1.33003	11.11063
60.00000	0.0	129.90971	1.33222	11.08462
60.00000	0.10000	129.89661	1.33213	11.08574
60.00000	0.20000	129.85466	1.33185	11.08932
60.00000	0.30000	129.77531	1.33131	11.09610
70.00000	0.0	130.07841	1.33345	11.07024
70.00000	0.10000	130.06883	1.33339	11.07106
70.00000	0.20000	130.03801	1.33319	11.07368
70.00000	0.30000	129.97963	1.33280	11.07866
80.00000	0.0	130.27400	1.33484	11.05363
80.00000	0.10000	130.26836	1.33481	11.05410
80.00000	0.20000	130.25029	1.33469	11.05564
80.00000	0.30000	130.21614	1.33448	11.05854
90.00000	0.0	130.49245	1.33635	11.03512
90.00000	0.10000	130.49126	1.33635	11.03522
90.00000	0.20000	130.48740	1.33633	11.03555
90.00000	0.30000	130.48012	1.33630	11.03616
100.00000	0.0	130.72775	1.33794	11.01526
100.00000	0.10000	130.73134	1.33797	11.01496
100.00000	0.20000	130.74274	1.33805	11.01400
100.00000	0.30000	130.76421	1.33822	11.01219
110.00000	0.0	130.97179	1.33955	10.99473

S = 11.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.10000	130.98035	1.33961	10.99402
110.00000	0.20000	131.00739	1.33980	10.99175
110.00000	0.30000	131.05858	1.34016	10.98745
120.00000	0.0	131.21489	1.34113	10.97436
120.00000	0.10000	131.22824	1.34122	10.97325
120.00000	0.20000	131.27086	1.34151	10.96968
120.00000	0.30000	131.35141	1.34207	10.96296
130.00000	0.0	131.44615	1.34260	10.95506
130.00000	0.10000	131.46414	1.34273	10.95356
130.00000	0.20000	131.52148	1.34311	10.94878
130.00000	0.30000	131.62976	1.34385	10.93977
140.00000	0.0	131.65451	1.34392	10.93772
140.00000	0.10000	131.67668	1.34407	10.93588
140.00000	0.20000	131.74721	1.34454	10.93002
140.00000	0.30000	131.88048	1.34543	10.91898
150.00000	0.0	131.82947	1.34501	10.92320
150.00000	0.10000	131.85506	1.34518	10.92108
150.00000	0.20000	131.93663	1.34572	10.91433
150.00000	0.30000	132.09071	1.34675	10.90160

S = 11.5 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	123.71620	1.28906	11.63954
0.0	0.10000	123.69232	1.28889	11.64179
0.0	0.20000	123.61613	1.28834	11.64896
0.0	0.30000	123.47165	1.28730	11.66260
10.00000	0.0	123.72852	1.28917	11.63838
10.00000	0.10000	123.70491	1.28900	11.64060
10.00000	0.20000	123.62958	1.28846	11.64770
10.00000	0.30000	123.48663	1.28743	11.66118
20.00000	0.0	123.76584	1.28948	11.63487
20.00000	0.10000	123.74307	1.28932	11.63701
20.00000	0.20000	123.67015	1.28880	11.64388
20.00000	0.30000	123.53200	1.28780	11.65690
30.00000	0.0	123.82953	1.29001	11.62889
30.00000	0.10000	123.80795	1.28986	11.63092
30.00000	0.20000	123.73940	1.28937	11.63736
30.00000	0.30000	123.60928	1.28844	11.64961
40.00000	0.0	123.92102	1.29075	11.62030
40.00000	0.10000	123.90143	1.29061	11.62214
40.00000	0.20000	123.83885	1.29017	11.62801
40.00000	0.30000	123.72031	1.28933	11.63916
50.00000	0.0	124.04190	1.29170	11.60898
50.00000	0.10000	124.02486	1.29158	11.61057
50.00000	0.20000	123.97034	1.29120	11.61568
50.00000	0.30000	123.86694	1.29047	11.62538
60.00000	0.0	124.19313	1.29285	11.59484
60.00000	0.10000	124.17918	1.29275	11.59615
60.00000	0.20000	124.13460	1.29245	11.60031
60.00000	0.30000	124.05019	1.29186	11.60820
70.00000	0.0	124.37427	1.29419	11.57796
70.00000	0.10000	124.36407	1.29412	11.57891
70.00000	0.20000	124.33138	1.29390	11.58195
70.00000	0.30000	124.26949	1.29348	11.58772
80.00000	0.0	124.58311	1.29569	11.55855
80.00000	0.10000	124.57712	1.29565	11.55910
80.00000	0.20000	124.55812	1.29553	11.56087
80.00000	0.30000	124.52217	1.29530	11.56421
90.00000	0.0	124.81543	1.29732	11.53703
90.00000	0.10000	124.81415	1.29731	11.53715
90.00000	0.20000	124.81030	1.29730	11.53751
90.00000	0.30000	124.80284	1.29726	11.53820
100.00000	0.0	125.06461	1.29903	11.51405
100.00000	0.10000	125.06845	1.29906	11.51369
100.00000	0.20000	125.08069	1.29915	11.51257
100.00000	0.30000	125.10371	1.29933	11.51045
110.00000	0.0	125.32225	1.30075	11.49038

S = 11.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.10000	125.33124	1.30082	11.48955
110.00000	0.20000	125.36000	1.30103	11.48692
110.00000	0.30000	125.41435	1.30141	11.48194
120.00000	0.0	125.57800	1.30244	11.46698
120.00000	0.10000	125.59213	1.30254	11.46569
120.00000	0.20000	125.63733	1.30285	11.46156
120.00000	0.30000	125.72249	1.30345	11.45380
130.00000	0.0	125.82085	1.30402	11.44484
130.00000	0.10000	125.83984	1.30415	11.44312
130.00000	0.20000	125.90036	1.30456	11.43762
130.00000	0.30000	126.01472	1.30535	11.42724
140.00000	0.0	126.03911	1.30542	11.42502
140.00000	0.10000	126.06248	1.30558	11.42291
140.00000	0.20000	126.13687	1.30608	11.41617
140.00000	0.30000	126.27716	1.30704	11.40349
150.00000	0.0	126.22212	1.30658	11.40846
150.00000	0.10000	126.24908	1.30676	11.40602
150.00000	0.20000	126.33493	1.30734	11.39827
150.00000	0.30000	126.49706	1.30844	11.38366

S = 12.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	118.43275	1.25207	12.15880
0.0	0.10000	118.40717	1.25189	12.16143
0.0	0.20000	118.32558	1.25129	12.16981
0.0	0.30000	118.17082	1.25016	12.18575
10.00000	0.0	118.44620	1.25219	12.15742
10.00000	0.10000	118.42094	1.25200	12.16001
10.00000	0.20000	118.34023	1.25141	12.16830
10.00000	0.30000	118.18718	1.25030	12.18406
20.00000	0.0	118.48711	1.25253	12.15322
20.00000	0.10000	118.46263	1.25235	12.15573
20.00000	0.20000	118.38474	1.25179	12.16373
20.00000	0.30000	118.23682	1.25071	12.17895
30.00000	0.0	118.55644	1.25311	12.14611
30.00000	0.10000	118.53342	1.25294	12.14847
30.00000	0.20000	118.46014	1.25241	12.15599
30.00000	0.30000	118.32104	1.25141	12.17028
40.00000	0.0	118.65573	1.25391	12.13595
40.00000	0.10000	118.63484	1.25376	12.13809
40.00000	0.20000	118.56816	1.25329	12.14491
40.00000	0.30000	118.44167	1.25238	12.15788
50.00000	0.0	118.78635	1.25495	12.12260
50.00000	0.10000	118.76820	1.25482	12.12446
50.00000	0.20000	118.71017	1.25441	12.13038
50.00000	0.30000	118.60019	1.25363	12.14163
60.00000	0.0	118.94890	1.25620	12.10604
60.00000	0.10000	118.93410	1.25609	12.10754
60.00000	0.20000	118.88684	1.25576	12.11236
60.00000	0.30000	118.79723	1.25514	12.12149
70.00000	0.0	119.14270	1.25765	12.08635
70.00000	0.10000	119.13182	1.25757	12.08745
70.00000	0.20000	119.09732	1.25733	12.09095
70.00000	0.30000	119.03194	1.25689	12.09759
80.00000	0.0	119.36508	1.25926	12.06383
80.00000	0.10000	119.35883	1.25922	12.06446
80.00000	0.20000	119.33879	1.25909	12.06649
80.00000	0.30000	119.30096	1.25884	12.07031
90.00000	0.0	119.61142	1.26102	12.03898
90.00000	0.10000	119.61014	1.26101	12.03911
90.00000	0.20000	119.60620	1.26099	12.03951
90.00000	0.30000	119.59866	1.26096	12.04027
100.00000	0.0	119.87471	1.26285	12.01254
100.00000	0.10000	119.87881	1.26288	12.01213
100.00000	0.20000	119.89183	1.26298	12.01083
100.00000	0.30000	119.91656	1.26317	12.00835
110.00000	0.0	120.14597	1.26469	11.98542

S = 12.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
110.00000	0.10000	120.15556	1.26476	11.98446
110.00000	0.20000	120.18602	1.26498	11.98143
110.00000	0.30000	120.24364	1.26540	11.97569
120.00000	0.0	120.41466	1.26649	11.95868
120.00000	0.10000	120.42955	1.26660	11.95720
120.00000	0.20000	120.47722	1.26694	11.95247
120.00000	0.30000	120.56718	1.26757	11.94355
130.00000	0.0	120.66905	1.26817	11.93347
130.00000	0.10000	120.68907	1.26831	11.93149
130.00000	0.20000	120.75284	1.26876	11.92518
130.00000	0.30000	120.87320	1.26959	11.91331
140.00000	0.0	120.89734	1.26966	11.91093
140.00000	0.10000	120.92191	1.26983	11.90851
140.00000	0.20000	121.00014	1.27037	11.90081
140.00000	0.30000	121.14761	1.27139	11.88632
150.00000	0.0	121.08847	1.27089	11.89213
150.00000	0.10000	121.11681	1.27109	11.88935
150.00000	0.20000	121.20694	1.27171	11.88051
150.00000	0.30000	121.37711	1.27287	11.86385

S = 12.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	113.56393	1.21749	12.68008
0.0	0.10000	113.53664	1.21729	12.68313
0.0	0.20000	113.44949	1.21665	12.69287
10.00000	0.0	113.57857	1.21762	12.67845
10.00000	0.10000	113.55162	1.21742	12.68146
10.00000	0.20000	113.46550	1.21678	12.69108
20.00000	0.0	113.62309	1.21799	12.67348
20.00000	0.10000	113.59698	1.21780	12.67639
20.00000	0.20000	113.51387	1.21719	12.68567
30.00000	0.0	113.69824	1.21862	12.66510
30.00000	0.10000	113.67375	1.21844	12.66783
30.00000	0.20000	113.59570	1.21787	12.67654
40.00000	0.0	113.80559	1.21950	12.65316
40.00000	0.10000	113.78333	1.21934	12.65563
40.00000	0.20000	113.71237	1.21882	12.66353
50.00000	0.0	113.94612	1.22062	12.63755
50.00000	0.10000	113.92686	1.22048	12.63969
50.00000	0.20000	113.86525	1.22004	12.64653
60.00000	0.0	114.12024	1.22197	12.61827
60.00000	0.10000	114.10457	1.22186	12.62000
60.00000	0.20000	114.05449	1.22150	12.62554
70.00000	0.0	114.32686	1.22353	12.59546
70.00000	0.10000	114.31548	1.22345	12.59672
70.00000	0.20000	114.27901	1.22320	12.60074
80.00000	0.0	114.56302	1.22527	12.56950
80.00000	0.10000	114.55652	1.22523	12.57021
80.00000	0.20000	114.53554	1.22509	12.57252
90.00000	0.0	114.82367	1.22715	12.54097
90.00000	0.10000	114.82239	1.22714	12.54111
90.00000	0.20000	114.81836	1.22713	12.54155
100.00000	0.0	115.10126	1.22910	12.51072
100.00000	0.10000	115.10562	1.22914	12.51025
100.00000	0.20000	115.11949	1.22925	12.50874
110.00000	0.0	115.38638	1.23108	12.47981
110.00000	0.10000	115.39647	1.23115	12.47872
110.00000	0.20000	115.42867	1.23139	12.47524
120.00000	0.0	115.66798	1.23299	12.44942
120.00000	0.10000	115.68373	1.23310	12.44773
120.00000	0.20000	115.73390	1.23346	12.44234
130.00000	0.0	115.93411	1.23477	12.42085
130.00000	0.10000	115.95508	1.23492	12.41860
130.00000	0.20000	116.02209	1.23540	12.41143

S = 12.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
140.00000	0.0	116.17241	1.23635	12.39537
140.00000	0.10000	116.19817	1.23653	12.39262
140.00000	0.20000	116.28026	1.23711	12.38387
150.00000	0.0	116.37167	1.23766	12.37414
150.00000	0.10000	116.40129	1.23786	12.37100
150.00000	0.20000	116.49579	1.23852	12.36096

S = 13.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	109.06174	1.18507	13.20353
0.0	0.10000	109.03271	1.18486	13.20704
0.0	0.20000	108.93985	1.18416	13.21830
10.00000	0.0	109.07765	1.18521	13.20160
10.00000	0.10000	109.04898	1.18500	13.20507
10.00000	0.20000	108.95721	1.18431	13.21620
20.00000	0.0	109.12576	1.18562	13.19578
20.00000	0.10000	109.09811	1.18541	13.19913
20.00000	0.20000	109.00952	1.18475	13.20985
30.00000	0.0	109.20699	1.18630	13.18597
30.00000	0.10000	109.18097	1.18611	13.18911
30.00000	0.20000	109.09795	1.18549	13.19915
40.00000	0.0	109.32254	1.18725	13.17203
40.00000	0.10000	109.29892	1.18707	13.17488
40.00000	0.20000	109.22368	1.18652	13.18395
50.00000	0.0	109.47319	1.18846	13.15390
50.00000	0.10000	109.45282	1.18831	13.15635
50.00000	0.20000	109.38760	1.18783	13.16420
60.00000	0.0	109.65919	1.18991	13.13159
60.00000	0.10000	109.64259	1.18980	13.13358
60.00000	0.20000	109.58969	1.18941	13.13992
70.00000	0.0	109.87892	1.19159	13.10533
70.00000	0.10000	109.86694	1.19151	13.10676
70.00000	0.20000	109.82851	1.19124	13.11135
80.00000	0.0	110.12912	1.19346	13.07556
80.00000	0.10000	110.12219	1.19341	13.07638
80.00000	0.20000	110.10028	1.19327	13.07899
90.00000	0.0	110.40414	1.19547	13.04299
90.00000	0.10000	110.40286	1.19546	13.04314
90.00000	0.20000	110.39883	1.19544	13.04361
100.00000	0.0	110.69620	1.19755	13.00858
100.00000	0.10000	110.70082	1.19759	13.00803
100.00000	0.20000	110.71564	1.19771	13.00629
110.00000	0.0	110.99536	1.19965	12.97351
110.00000	0.10000	111.00598	1.19973	12.97227
110.00000	0.20000	111.03996	1.19998	12.96830
120.00000	0.0	111.28998	1.20168	12.93917
120.00000	0.10000	111.30659	1.20180	12.93724
120.00000	0.20000	111.35931	1.20218	12.93111
130.00000	0.0	111.56783	1.20357	12.90695
130.00000	0.10000	111.58992	1.20373	12.90439
130.00000	0.20000	111.66019	1.20423	12.89627

S = 13.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
140.00000	0.0	111.81631	1.20524	12.87826
140.00000	0.10000	111.84328	1.20543	12.87516
140.00000	0.20000	111.92914	1.20604	12.86528
150.00000	0.0	112.02362	1.20662	12.85443
150.00000	0.10000	112.05470	1.20684	12.85087
150.00000	0.20000	112.15349	1.20753	12.83955

S = 13.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	104.88522	1.15460	13.72929
0.0	0.10000	104.85432	1.15437	13.73334
0.0	0.20000	104.75563	1.15362	13.74628
10.00000	0.0	104.90234	1.15475	13.72705
10.00000	0.10000	104.87187	1.15452	13.73104
10.00000	0.20000	104.77438	1.15378	13.74382
20.00000	0.0	104.95430	1.15519	13.72026
20.00000	0.10000	104.92485	1.15497	13.72411
20.00000	0.20000	104.83087	1.15426	13.73641
30.00000	0.0	105.04169	1.15592	13.70884
30.00000	0.10000	105.01405	1.15572	13.71245
30.00000	0.20000	104.92596	1.15506	13.72396
40.00000	0.0	105.16556	1.15695	13.69270
40.00000	0.10000	105.14064	1.15676	13.69594
40.00000	0.20000	105.06087	1.15617	13.70634
50.00000	0.0	105.32664	1.15825	13.67175
50.00000	0.10000	105.30507	1.15809	13.67455
50.00000	0.20000	105.23618	1.15759	13.68351
60.00000	0.0	105.52463	1.15982	13.64610
60.00000	0.10000	105.50717	1.15969	13.64836
60.00000	0.20000	105.45145	1.15928	13.65557
70.00000	0.0	105.75780	1.16162	13.61602
70.00000	0.10000	105.74512	1.16153	13.61765
70.00000	0.20000	105.70480	1.16124	13.62284
80.00000	0.0	106.02220	1.16361	13.58206
80.00000	0.10000	106.01501	1.16356	13.58298
80.00000	0.20000	105.99208	1.16341	13.58592
90.00000	0.0	106.31195	1.16575	13.54504
90.00000	0.10000	106.31067	1.16575	13.54521
90.00000	0.20000	106.30656	1.16573	13.54573
100.00000	0.0	106.61864	1.16797	13.50608
100.00000	0.10000	106.62352	1.16801	13.50546
100.00000	0.20000	106.63919	1.16813	13.50348
110.00000	0.0	106.93184	1.17020	13.46652
110.00000	0.10000	106.94305	1.17028	13.46511
110.00000	0.20000	106.97882	1.17055	13.46061
120.00000	0.0	107.23964	1.17235	13.42787
120.00000	0.10000	107.25702	1.17248	13.42569
120.00000	0.20000	107.31232	1.17288	13.41878
130.00000	0.0	107.52930	1.17435	13.39170
130.00000	0.10000	107.55241	1.17451	13.38882
130.00000	0.20000	107.62595	1.17505	13.37967

S = 13.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
140.00000	0.0	107.78789	1.17611	13.35957
140.00000	0.10000	107.81606	1.17631	13.35608
140.00000	0.20000	107.90584	1.17696	13.34497
150.00000	0.0	108.00342	1.17756	13.33291
150.00000	0.10000	108.03577	1.17779	13.32892
150.00000	0.20000	108.13901	1.17853	13.31619

S = 14.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	100.99940	1.12588	14.25751
0.0	0.10000	100.96661	1.12563	14.26214
0.0	0.20000	100.86201	1.12483	14.27693
10.00000	0.0	101.01781	1.12604	14.25491
10.00000	0.10000	100.98546	1.12579	14.25948
10.00000	0.20000	100.88214	1.12500	14.27408
20.00000	0.0	101.07361	1.12652	14.24704
20.00000	0.10000	101.04245	1.12628	14.25143
20.00000	0.20000	100.94283	1.12552	14.26550
30.00000	0.0	101.16725	1.12731	14.23385
30.00000	0.10000	101.13808	1.12709	14.23796
30.00000	0.20000	101.04486	1.12638	14.25110
40.00000	0.0	101.29976	1.12841	14.21523
40.00000	0.10000	101.27339	1.12821	14.21894
40.00000	0.20000	101.18916	1.12758	14.23077
50.00000	0.0	101.47147	1.12981	14.19118
50.00000	0.10000	101.44870	1.12964	14.19437
50.00000	0.20000	101.37602	1.12910	14.20454
60.00000	0.0	101.68178	1.13149	14.16183
60.00000	0.10000	101.66347	1.13135	14.16438
60.00000	0.20000	101.60474	1.13092	14.17257
70.00000	0.0	101.92854	1.13341	14.12754
70.00000	0.10000	101.91528	1.13332	14.12938
70.00000	0.20000	101.87291	1.13301	14.13526
80.00000	0.0	102.20743	1.13554	14.08899
80.00000	0.10000	102.19989	1.13549	14.09003
80.00000	0.20000	102.17593	1.13532	14.09334
90.00000	0.0	102.51205	1.13782	14.04713
90.00000	0.10000	102.51077	1.13781	14.04730
90.00000	0.20000	102.50658	1.13779	14.04788
100.00000	0.0	102.83348	1.14017	14.00322
100.00000	0.10000	102.83870	1.14021	14.00251
100.00000	0.20000	102.85530	1.14035	14.00025
110.00000	0.0	103.16096	1.14253	13.95877
110.00000	0.10000	103.17278	1.14262	13.95717
110.00000	0.20000	103.21027	1.14290	13.95210
120.00000	0.0	103.48204	1.14480	13.91546
120.00000	0.10000	103.50018	1.14494	13.91302
120.00000	0.20000	103.55814	1.14537	13.90523
130.00000	0.0	103.78360	1.14691	13.87502
130.00000	0.10000	103.80774	1.14709	13.87180
130.00000	0.20000	103.88460	1.14765	13.86153

S = 14.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
140.00000	0.0	104.05229	1.14877	13.83920
140.00000	0.10000	104.08173	1.14898	13.83528
140.00000	0.20000	104.17537	1.14966	13.82284
150.00000	0.0	104.27596	1.15030	13.80951
150.00000	0.10000	104.30977	1.15054	13.80503
150.00000	0.20000	104.41727	1.15132	13.79082

S = 14.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	97.37387	1.09875	14.78836
0.0	0.10000	97.33922	1.09848	14.79363
10.00000	0.0	97.39374	1.09892	14.78534
10.00000	0.10000	97.35950	1.09866	14.79054
20.00000	0.0	97.45340	1.09943	14.77629
20.00000	0.10000	97.42044	1.09918	14.78129
30.00000	0.0	97.55363	1.10029	14.76111
30.00000	0.10000	97.52281	1.10005	14.76577
40.00000	0.0	97.69485	1.10147	14.73977
40.00000	0.10000	97.66704	1.10126	14.74397
50.00000	0.0	97.87744	1.10297	14.71228
50.00000	0.10000	97.85347	1.10279	14.71588
60.00000	0.0	98.10033	1.10476	14.67885
60.00000	0.10000	98.08098	1.10462	14.68174
70.00000	0.0	98.36089	1.10682	14.63996
70.00000	0.10000	98.34703	1.10672	14.64203
80.00000	0.0	98.65448	1.10908	14.59640
80.00000	0.10000	98.64670	1.10903	14.59755
90.00000	0.0	98.97418	1.11150	14.54925
90.00000	0.10000	98.97290	1.11149	14.54944
100.00000	0.0	99.31059	1.11399	14.49996
100.00000	0.10000	99.31606	1.11403	14.49916
110.00000	0.0	99.65245	1.11648	14.45022
110.00000	0.10000	99.66478	1.11658	14.44843
120.00000	0.0	99.98680	1.11888	14.40190
120.00000	0.10000	100.00580	1.11902	14.39916
130.00000	0.0	100.30025	1.12110	14.35689
130.00000	0.10000	100.32541	1.12129	14.35329
140.00000	0.0	100.57912	1.12305	14.31709
140.00000	0.10000	100.60976	1.12328	14.31273
150.00000	0.0	100.81100	1.12466	14.28415
150.00000	0.10000	100.84610	1.12492	14.27918

S = 15.0 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	93.98262	1.07306	15.32198
0.0	0.10000	93.94600	1.07278	15.32795
10.00000	0.0	94.00377	1.07325	15.31853
10.00000	0.10000	93.96765	1.07297	15.32442
20.00000	0.0	94.06754	1.07380	15.30815
20.00000	0.10000	94.03279	1.07353	15.31381
30.00000	0.0	94.17436	1.07471	15.29078
30.00000	0.10000	94.14192	1.07446	15.29605
40.00000	0.0	94.32468	1.07598	15.26642
40.00000	0.10000	94.29539	1.07576	15.27116
50.00000	0.0	94.51830	1.07758	15.23514
50.00000	0.10000	94.49313	1.07739	15.23920
60.00000	0.0	94.75403	1.07950	15.19724
60.00000	0.10000	94.73373	1.07934	15.20050
70.00000	0.0	95.02870	1.08168	15.15332
70.00000	0.10000	95.01414	1.08158	15.15564
80.00000	0.0	95.33719	1.08409	15.10428
80.00000	0.10000	95.32906	1.08403	15.10557
90.00000	0.0	95.67213	1.08665	15.05140
90.00000	0.10000	95.67085	1.08664	15.05161
100.00000	0.0	96.02368	1.08928	14.99630
100.00000	0.10000	96.02942	1.08933	14.99540
110.00000	0.0	96.38000	1.09191	14.94086
110.00000	0.10000	96.39285	1.09201	14.93887
120.00000	0.0	96.72780	1.09444	14.88714
120.00000	0.10000	96.74756	1.09459	14.88409
130.00000	0.0	97.05315	1.09677	14.83723
130.00000	0.10000	97.07942	1.09696	14.83321
140.00000	0.0	97.34230	1.09882	14.79316
140.00000	0.10000	97.37413	1.09905	14.78832
150.00000	0.0	97.58221	1.10050	14.75679
150.00000	0.10000	97.61877	1.10077	14.75126

S = 15.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	90.80272	1.04870	15.85855
0.0	0.10000	90.76402	1.04839	15.86531
10.00000	0.0	90.82523	1.04889	15.85462
10.00000	0.10000	90.78714	1.04859	15.86128
20.00000	0.0	90.89319	1.04949	15.84277
20.00000	0.10000	90.85648	1.04920	15.84917
30.00000	0.0	91.00677	1.05046	15.82300
30.00000	0.10000	90.97253	1.05019	15.82895
40.00000	0.0	91.16634	1.05182	15.79530
40.00000	0.10000	91.13551	1.05158	15.80064
50.00000	0.0	91.37125	1.05353	15.75988
50.00000	0.10000	91.34480	1.05332	15.76444
60.00000	0.0	91.62000	1.05556	15.71709
60.00000	0.10000	91.59877	1.05540	15.72073
70.00000	0.0	91.90897	1.05789	15.66768
70.00000	0.10000	91.89381	1.05777	15.67026
80.00000	0.0	92.23270	1.06043	15.61268
80.00000	0.10000	92.22421	1.06037	15.61412
90.00000	0.0	92.58313	1.06314	15.55359
90.00000	0.10000	92.58176	1.06313	15.55382
100.00000	0.0	92.94991	1.06592	15.49221
100.00000	0.10000	92.95598	1.06597	15.49120
110.00000	0.0	93.32080	1.06869	15.43064
110.00000	0.10000	93.33423	1.06879	15.42842
120.00000	0.0	93.68202	1.07134	15.37115
120.00000	0.10000	93.70273	1.07150	15.36775
130.00000	0.0	94.01944	1.07379	15.31598
130.00000	0.10000	94.04666	1.07400	15.31155
140.00000	0.0	94.31868	1.07594	15.26739
140.00000	0.10000	94.35181	1.07619	15.26203
150.00000	0.0	94.56682	1.07770	15.22733
150.00000	0.10000	94.60474	1.07798	15.22122

S =16.0 REVS./DAY TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	87.81413	1.02554	16.39827
0.0	0.10000	87.77347	1.02521	16.40587
10.00000	0.0	87.83817	1.02575	16.39378
10.00000	0.10000	87.79803	1.02543	16.40128
20.00000	0.0	87.91034	1.02638	16.38033
20.00000	0.10000	87.87178	1.02607	16.38751
30.00000	0.0	88.03088	1.02742	16.35789
30.00000	0.10000	87.99493	1.02714	16.36458
40.00000	0.0	88.19987	1.02887	16.32655
40.00000	0.10000	88.16748	1.02861	16.33255
50.00000	0.0	88.41637	1.03069	16.28658
50.00000	0.10000	88.38863	1.03047	16.29169
60.00000	0.0	88.67841	1.03285	16.23845
60.00000	0.10000	88.65617	1.03268	16.24252
70.00000	0.0	88.98201	1.03531	16.18304
70.00000	0.10000	88.96616	1.03519	16.18593
80.00000	0.0	89.32117	1.03801	16.12160
80.00000	0.10000	89.31229	1.03794	16.12320
90.00000	0.0	89.68719	1.04086	16.05580
90.00000	0.10000	89.68584	1.04086	16.05605
100.00000	0.0	90.06932	1.04379	15.98768
100.00000	0.10000	90.07567	1.04385	15.98656
110.00000	0.0	90.45485	1.04670	15.91954
110.00000	0.10000	90.46889	1.04681	15.91707
120.00000	0.0	90.82968	1.04949	15.85385
120.00000	0.10000	90.85117	1.04965	15.85010
130.00000	0.0	91.17900	1.05205	15.79311
130.00000	0.10000	91.20734	1.05227	15.78820
140.00000	0.0	91.48853	1.05430	15.73968
140.00000	0.10000	91.52284	1.05456	15.73378
150.00000	0.0	91.74487	1.05614	15.69570
150.00000	0.10000	91.78409	1.05644	15.68899

S = 16.5 REVS./DAY

TABLE 2 (Continued)

I (DEGREES)	e	PERIOD (MINUTES)	$\bar{a}$ (e.r.)	$\bar{n}$ (REVS./DAY)
0.0	0.0	84.99930	1.00348	16.94131
0.0	0.10000	84.95653	1.00313	16.94984
10.00000	0.0	85.02472	1.00370	16.93625
10.00000	0.10000	84.98253	1.00336	16.94466
20.00000	0.0	85.10132	1.00438	16.92101
20.00000	0.10000	85.06082	1.00405	16.92906
30.00000	0.0	85.22905	1.00549	16.89565
30.00000	0.10000	85.19128	1.00519	16.90314
40.00000	0.0	85.40762	1.00703	16.86032
40.00000	0.10000	85.37370	1.00676	16.86702
50.00000	0.0	85.63602	1.00896	16.81535
50.00000	0.10000	85.60696	1.00873	16.82106
60.00000	0.0	85.91161	1.01126	16.76141
60.00000	0.10000	85.88838	1.01108	16.76595
70.00000	0.0	86.23007	1.01386	16.69951
70.00000	0.10000	86.21353	1.01373	16.70271
80.00000	0.0	86.58475	1.01671	16.63110
80.00000	0.10000	86.57553	1.01664	16.63287
90.00000	0.0	86.96663	1.01972	16.55807
90.00000	0.10000	86.96526	1.01971	16.55833
100.00000	0.0	87.36443	1.02280	16.48268
100.00000	0.10000	87.37105	1.02285	16.48143
110.00000	0.0	87.76472	1.02585	16.40750
110.00000	0.10000	87.77942	1.02597	16.40475
120.00000	0.0	88.15315	1.02877	16.33521
120.00000	0.10000	88.17548	1.02894	16.33107
130.00000	0.0	88.51456	1.03145	16.26851
130.00000	0.10000	88.54396	1.03168	16.26311
140.00000	0.0	88.83426	1.03380	16.20996
140.00000	0.10000	88.86981	1.03407	16.20348
150.00000	0.0	89.09871	1.03572	16.16185
150.00000	0.10000	89.13936	1.03603	16.15448

Table 3
2 Day Resonant Orbit Satellites (June 1968)

s Revs. Day	Satellite	Perigee Ht. (km.)	Inclination (Deg's)	Maximum Resonant Perturbation			Comments				
				Beat Period (Days)	Amplitude Along Track (km)	Harmonic (ℓ,m,p,q)	Satellite Code Name	Shape	Dimensions (m.) Length × Diam.	Weight (kg)	Area to Mass Ratio, $cm^2/gm.$ max-min
14.5	1960-16B	605	48.5	919	677	(38,29,18,0)	Tiros 2 Rocket	Cyl.	1.5 × .46	23	.30-.072
14.5	1962-39D	614	98.6	-29.6	2.09	(30,29,14,0)	Fragments				
14.5	1962-71C	686	90.6	30.1	1.49	(30,29,14,0)	Transit 5A Rocket	Cyl.	1.8 × .46	23	.30-.072
13.5	1964-83E	1024	89.9	48,869	300	(27,27,12,-1)	Fragment				
13.5	1964-63A	1037	89.8	259	33.4	(28,27,13,0)	Ablestar Rocket	Cyl.	5.3 × 1.4	450	.16-.034
13.5	1964-83C	1024	89.9	216	23.8	(28,27,13,0)	Radiation Satellite			60	
13.5	1964-83D	1028	89.9	216	23.8	(28,27,13,0)	Transit			60	
13.5	1964-63B	1056	89.8	-15.2	0.116	(28,27,13,0)	Thor Ablestar				
12.5	1964-76G	524	81.3	1,031	57.8	(26,25,10,-4)	Fragments				
12.5	1966-44A	260	64.6	60.1	12.6	(28,25,13,0)	Explorer 32 (AEB)	Sphere	0.89	225	.003
12.5	1964-76E	536	81.3	-24.2	1.82	(25,25,12,1)	Fragment				
12.5	1966-16D	1350	100.9	67.0	1.41	(26,25,12,0)	Fragment				
10.5	1966-70A	359	81.4	12.9	.741	(21,21,10,1)	OV3-3	Octagon	.7 × .7	75	.0045
9.5	1966-34C	338	82.4	40.3	7.54	(19,19,8,-1)	Fragment				
9.5	1966-34A	356	82.4	34.8	5.64	(19,19,8,-1)	OV3-1	Octagon	.7 × .7	69	.005
8.5	1964-06A	403	60.8	-26.4	2.16	(19,17,9,1)	Elektron 1	Cyl + 6 Paddles	3 × 2		
0.5	1967-40C	10236	35.6	35.3	7.69	(2,2,0,2)					

TABLE 4
Resonant Harmonic Perturbations of 2 Day Commensurate Orbits

SATELLITE 60-16B

S = 14.5 REV./DAY PERIGEE HEIGHT = 585. KM.

A = 1.102700 E.R. E = 0.0100 I = 48.50 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
30,29,14, 0	919.0	1.34D-01	1.65D 04	8.12D-01
32,29,15, 0	919.0	7.97D-01	9.79D 04	4.83D 00
33,29,15, -1	77.9	2.37D-03	2.91D 02	1.71D-01
33,29,16, 1	-93.8	1.63D-03	2.00D 02	9.60D-02
34,29,16, 0	919.0	2.41D 00	2.96D 05	1.46D 01
35,29,16, -1	77.9	5.22D-03	6.41D 02	3.77D-01
35,29,17, 1	-93.8	4.59D-03	5.64D 02	2.70D-01
36,29,17, 0	919.0	4.54D 00	5.57D 05	2.75D 01
37,29,17, -1	77.9	7.13D-03	8.75D 02	5.15D-01
37,29,18, 1	-93.8	8.45D-03	1.04D 03	4.96D-01
38,29,18, 0	919.0	5.52D 00	6.77D 05	3.34D 01
39,29,18, -1	77.9	5.63D-03	6.91D 02	4.06D-01
39,29,19, 1	-93.8	1.03D-02	1.27D 03	6.07D-01
40,29,19, 0	919.0	3.97D 00	4.88D 05	2.41D 01

CUTOFF: 100 METERS, TRANSVERSE

SATELLITE 62-39D

S = 14.5 REV./DAY PERIGEE HEIGHT = 730. KM.

A = 1.114500 E.R. E = 0.0 I = 98.60 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
30,29,14, 0	-29.6	1.69D-02	2.09D 03	3.17D 00
32,29,15, 0	-29.6	8.47D-04	1.05D 02	1.59D-01
34,29,16, 0	-29.6	4.10D-03	5.09D 02	7.69D-01
36,29,17, 0	-29.6	3.95D-03	4.90D 02	7.40D-01
38,29,18, 0	-29.6	2.40D-03	2.98D 02	4.48D-01
40,29,19, 0	-29.6	9.55D-04	1.18D 02	1.78D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 62-71C

S = 14.5 REV./DAY PERIGEE HEIGHT = 707. KM.

A = 1.110800 E.R. E = 0.0 I = 90.60 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
30,29,14, 0	30.1	1.21D-02	1.49D 03	2.33D 00
32,29,15, 0	30.1	9.10D-03	1.12D 03	1.76D 00
34,29,16, 0	30.1	6.33D-03	7.83D 02	1.23D 00
36,29,17, 0	30.1	4.31D-03	5.32D 02	8.35D-01
38,29,18, 0	30.1	2.90D-03	3.59D 02	5.63D-01
40,29,19, 0	30.1	1.95D-03	2.41D 02	3.79D-01

CUTOFF: 100 METERS, TRANSVERSE

SATELLITE 64-83E

S = 13.5 REV./DAY PERIGEE HEIGHT = 1056. KM.

A = 1.165500 E.R. E = 0.0 I = 89.90 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
27,27,12, -1	48868.6	2.31D 00	3.00D 05	3.02D-01
28,27,13, 0	123.2	5.99D-02	7.77D 03	3.12D 00
29,27,13, -1	48868.6	4.55D-01	5.90D 04	5.95D-02
30,27,14, 0	123.2	4.15D-02	5.39D 03	2.17D 00
31,27,14, -1	48868.6	1.75D-02	2.27D 03	2.29D-03
32,27,15, 0	123.2	2.68D-02	3.47D 03	1.40D 00
33,27,15, -1	48868.6	1.45D-01	1.88D 04	1.90D-02
34,27,16, 0	123.2	1.69D-02	2.20D 03	8.84D-01
35,27,16, -1	48868.6	1.59D-01	2.06D 04	2.07D-02
36,27,17, 0	123.2	1.07D-02	1.38D 03	5.57D-01
37,27,17, -1	48868.6	1.36D-01	1.77D 04	1.78D-02
38,27,18, 0	123.2	6.72D-03	8.72D 02	3.51D-01
39,27,18, -1	48868.6	1.07D-01	1.38D 04	1.39D-02
40,27,19, 0	123.2	4.25D-03	5.51D 02	2.22D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 64-63A

S = 13.5 REV./DAY PERIGEE HEIGHT = 1056. KM.

A = 1.165600 E.R. E = 0.0 I = 89.80 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P,	Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
28,27,13,	0	258.5	2.58D-01	3.34D 04	6.39D 00
30,27,14,	0	258.5	1.79D-01	2.33D 04	4.45D 00
32,27,15,	0	258.5	1.16D-01	1.51D 04	2.88D 00
34,27,16,	0	258.5	7.37D-02	9.57D 03	1.83D 00
36,27,17,	0	258.5	4.66D-02	6.05D 03	1.16D 00
38,27,18,	0	258.5	2.95D-02	3.83D 03	7.32D-01
40,27,19,	0	258.5	1.87D-02	2.43D 03	4.65D-01

CUTOFF: 100 METERS, TRANSVERSE

SATELLITE 64-83C

S = 13.5 REV./DAY PERIGEE HEIGHT = 1056. KM.

A = 1.165600 E.R. E = 0.0 I = 89.90 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P,	Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
28,27,13,	0	215.9	1.84D-01	2.38D 04	5.45D 00
30,27,14,	0	215.9	1.28D-01	1.65D 04	3.79D 00
32,27,15,	0	215.9	8.22D-02	1.07D 04	2.44D 00
34,27,16,	0	215.9	5.20D-02	6.75D 03	1.54D 00
36,27,17,	0	215.9	3.27D-02	4.25D 03	9.73D-01
38,27,18,	0	215.9	2.06D-02	2.68D 03	6.13D-01
40,27,19,	0	215.9	1.30D-02	1.69D 03	3.88D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 64-830

S = 13.5 REV./DAY PERIGEE HEIGHT = 1056. KM.

A = 1.165600 E.R. E = 0.0 I = 89.90 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
28,27,13, 0	215.9	1.34D-01	2.38D 04	5.45D 00
30,27,14, 0	215.9	1.28D-01	1.65D 04	3.79D 00
32,27,15, 0	215.9	8.22D-02	1.07D 04	2.44D 00
34,27,16, 0	215.9	5.20D-02	6.75D 03	1.54D 00
36,27,17, 0	215.9	3.27D-02	4.25D 03	9.73D-01
38,27,18, 0	215.9	2.06D-02	2.68D 03	6.13D-01
40,27,19, 0	215.9	1.30D-02	1.69D 03	3.88D-01

CUTOFF: 100 METERS, TRANSVERSE

SATELLITE 64-638

S = 13.5 REV./DAY PERIGEE HEIGHT = 1069. KM.

A = 1.167600 E.R. E = 0.0 I = 89.80 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
28,27,13, 0	-15.2	8.91D-04	1.16D 02	3.58D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 64-76G

S = 12.5 REV./DAY PERIGEE HEIGHT = 417. KM.

A = 1.224600 E.R. E = 0.1300 I = 81.30 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
25,25, 9, -5	-189.8	4.55D-03	6.20D 02	1.72D-01
25,25,10, -3	138.7	5.65D-02	7.71D 03	2.96D 00
25,25,11, -1	50.8	4.90D-02	6.68D 03	7.07D 00
25,25,12, 1	31.1	2.20D-02	3.00D 03	5.24D 00
26,25,10, -4	1031.0	4.24D-01	5.78D 04	2.97D 00
26,25,12, 0	38.6	1.77D-02	2.42D 03	3.39D 00
26,25,13, 2	26.0	8.22D-03	1.12D 03	2.35D 00
27,25,11, -3	138.7	3.20D-02	4.36D 03	1.68D 00
27,25,12, -1	50.8	2.35D-02	3.20D 03	3.39D 00
28,25,11, -4	1031.0	3.91D-01	5.34D 04	2.75D 00
28,25,13, 0	38.6	1.48D-02	2.01D 03	2.83D 00
28,25,14, 2	26.0	4.46D-03	6.09D 02	1.28D 00
29,25,12, -3	138.7	2.33D-02	3.17D 03	1.22D 00
29,25,13, -1	50.8	1.29D-02	1.76D 03	1.87D 00
30,25,12, -4	1031.0	3.34D-01	4.56D 04	2.35D 00
30,25,14, 0	38.6	1.09D-02	1.48D 03	2.08D 00
31,25,13, -3	138.7	1.83D-02	2.49D 03	9.58D-01
31,25,14, -1	50.8	6.81D-03	9.28D 02	9.85D-01
32,25,13, -4	1031.0	2.77D-01	3.78D 04	1.94D 00
32,25,14, -2	74.4	4.25D-03	5.80D 02	4.18D-01
32,25,15, 0	38.6	7.36D-03	1.00D 03	1.41D 00
33,25,14, -3	138.7	1.48D-02	2.02D 03	7.75D-01
34,25,14, -4	1031.0	2.23D-01	3.05D 04	1.57D 00
34,25,15, -2	74.4	4.64D-03	6.33D 02	4.57D-01
34,25,16, 0	38.6	4.60D-03	6.27D 02	8.83D-01
35,25,15, -3	138.7	1.20D-02	1.64D 03	6.30D-01
36,25,15, -4	1031.0	1.75D-01	2.38D 04	1.23D 00
36,25,16, -2	74.4	4.58D-03	6.24D 02	4.51D-01
37,25,16, -3	138.7	9.64D-03	1.31D 03	5.06D-01
38,25,16, -4	1031.0	1.31D-01	1.78D 04	9.17D-01
38,25,17, -2	74.4	4.20D-03	5.73D 02	4.14D-01
39,25,17, -3	138.7	7.55D-03	1.03D 03	3.96D-01
40,25,17, -4	1031.0	9.19D-02	1.25D 04	6.45D-01

CUTOFF: 500 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 66-44A

S = 12.5 REV./DAY PERIGEE HEIGHT = 246. KM.

A = 1.221900 E.R. E = 0.1500 I = 64.60 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
25,25,10, -3	67.1	1.36D-02	1.85D 03	1.47D 00
25,25,11, -1	62.3	3.47D-02	4.72D 03	4.05D 00
25,25,12, 1	58.1	1.98D-02	2.70D 03	2.48D 00
26,25,10, -4	69.8	7.65D-03	1.04D 03	7.96D-01
26,25,11, -2	64.6	4.65D-02	6.33D 03	5.24D 00
26,25,12, 0	60.1	7.07D-02	9.61D 03	8.55D 00
26,25,13, 2	56.3	2.28D-02	3.11D 03	2.96D 00
27,25,11, -3	67.1	1.92D-02	2.62D 03	2.08D 00
27,25,12, -1	62.3	8.45D-02	1.15D 04	9.87D 00
27,25,13, 1	58.1	7.60D-02	1.03D 04	9.52D 00
27,25,14, 3	54.5	1.56D-02	2.12D 03	2.08D 00
28,25,12, -2	64.6	2.71D-02	3.68D 03	3.05D 00
28,25,13, 0	60.1	9.27D-02	1.26D 04	1.12D 01
28,25,14, 2	56.3	5.30D-02	7.21D 03	6.87D 00
28,25,15, 4	52.8	7.62D-03	1.04D 03	1.05D 00
29,25,12, -3	67.1	9.25D-03	1.26D 03	1.00D 00
29,25,13, -1	62.3	1.80D-02	2.45D 03	2.10D 00
29,25,14, 1	58.1	6.58D-02	8.95D 03	8.25D 00
29,25,15, 3	54.5	2.69D-02	3.66D 03	3.60D 00
30,25,13, -2	64.6	2.54D-02	3.46D 03	2.87D 00
30,25,15, 2	56.3	3.22D-02	4.38D 03	4.17D 00
30,25,16, 4	52.8	1.07D-02	1.45D 03	1.48D 00
31,25,14, -1	62.3	3.99D-02	5.43D 03	4.67D 00
31,25,15, 1	58.1	1.84D-02	2.50D 03	2.31D 00
31,25,16, 3	54.5	1.13D-02	1.53D 03	1.51D 00
32,25,15, 0	60.1	4.05D-02	5.50D 03	4.91D 00
32,25,16, 2	56.3	1.88D-02	2.55D 03	2.43D 00
33,25,14, -3	67.1	9.41D-03	1.28D 03	1.02D 00
33,25,15, -1	62.3	9.30D-03	1.27D 03	1.09D 00
33,25,16, 1	58.1	2.80D-02	3.81D 03	3.52D 00
33,25,17, 3	54.5	1.20D-02	1.63D 03	1.61D 00
34,25,15, -2	64.6	1.48D-02	2.02D 03	1.67D 00
34,25,16, 0	60.1	1.82D-02	2.48D 03	2.21D 00
34,25,17, 2	56.3	1.38D-02	1.88D 03	1.79D 00
35,25,16, -1	62.3	1.60D-02	2.18D 03	1.88D 00
35,25,17, 1	58.1	1.98D-02	2.69D 03	2.49D 00
36,25,16, -2	64.6	1.10D-02	1.50D 03	1.24D 00
36,25,17, 0	60.1	1.18D-02	1.60D 03	1.43D 00
36,25,18, 2	56.3	1.49D-02	2.03D 03	1.94D 00
37,25,17, -1	62.3	1.64D-02	2.23D 03	1.92D 00
37,25,19, 3	54.5	8.60D-03	1.17D 03	1.16D 00
38,25,18, 0	60.1	1.77D-02	2.41D 03	2.16D 00
39,25,19, 1	58.1	1.46D-02	1.98D 03	1.83D 00
40,25,20, 2	56.3	9.41D-03	1.28D 03	1.23D 00

CUTOFF: 1000 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 64-76E

S = 12.5 REV./DAY PERIGEE HEIGHT = 430. KM.

A = 1.227000 E.R. E = 0.1300 I = 81.30 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
25,25,11, -1	-18.6	6.58D-03	8.99D 02	2.47D 00
25,25,12, 1	-24.2	1.34D-02	1.82D 03	3.89D 00
25,25,13, 3	-34.7	6.17D-03	8.42D 02	1.27D 00
25,25,14, 5	-60.8	1.23D-03	1.69D 02	1.46D-01
26,25,12, 0	-21.1	5.28D-03	7.22D 02	1.76D 00
26,25,13, 2	-28.5	9.84D-03	1.34D 03	2.44D 00
26,25,14, 4	-44.1	4.39D-03	6.00D 02	7.11D-01
26,25,15, 6	-97.4	1.21D-03	1.65D 02	8.91D-02
27,25,12, -1	-18.6	3.15D-03	4.31D 02	1.18D 00
27,25,13, 1	-24.2	2.10D-03	2.86D 02	6.08D-01
27,25,14, 3	-34.7	3.02D-03	4.12D 02	6.19D-01
27,25,15, 5	-60.8	2.11D-03	2.88D 02	2.48D-01
27,25,16, 7	-245.7	1.88D-03	2.57D 02	5.54D-02
28,25,13, 0	-21.1	4.40D-03	6.01D 02	1.46D 00
28,25,14, 2	-28.5	5.35D-03	7.31D 02	1.32D 00
28,25,16, 6	-97.4	8.43D-04	1.15D 02	6.23D-02
28,25,17, 8	470.3	1.26D-03	1.72D 02	1.94D-02
29,25,13, -1	-18.6	1.74D-03	2.37D 02	6.48D-01
29,25,14, 1	-24.2	1.23D-03	1.69D 02	3.58D-01
29,25,15, 3	-34.7	3.71D-03	5.06D 02	7.58D-01
29,25,16, 5	-60.8	1.12D-03	1.53D 02	1.32D-01
30,25,14, 0	-21.1	3.23D-03	4.41D 02	1.07D 00
30,25,15, 2	-28.5	1.97D-03	2.69D 02	4.86D-01
30,25,16, 4	-44.1	1.35D-03	1.85D 02	2.18D-01
30,25,17, 6	-97.4	9.98D-04	1.36D 02	7.37D-02
31,25,14, -1	-18.6	9.14D-04	1.25D 02	3.40D-01
31,25,15, 1	-24.2	2.17D-03	2.96D 02	6.26D-01
31,25,16, 3	-34.7	2.52D-03	3.45D 02	5.16D-01
31,25,18, 7	-245.7	1.38D-03	1.89D 02	4.06D-02
32,25,15, 0	-21.1	2.19D-03	2.99D 02	7.24D-01
32,25,17, 4	-44.1	1.62D-03	2.21D 02	2.61D-01
32,25,19, 8	470.3	7.46D-04	1.02D 02	1.15D-02
33,25,16, 1	-24.2	2.12D-03	2.90D 02	6.12D-01
33,25,17, 3	-34.7	1.18D-03	1.61D 02	2.41D-01
33,25,19, 7	-245.7	1.11D-03	1.52D 02	3.28D-02
34,25,16, 0	-21.1	1.37D-03	1.87D 02	4.51D-01
34,25,17, 2	-28.5	9.08D-04	1.24D 02	2.23D-01
34,25,18, 4	-44.1	1.21D-03	1.65D 02	1.94D-01
34,25,20, 8	470.3	1.05D-03	1.43D 02	1.62D-02
35,25,17, 1	-24.2	1.71D-03	2.33D 02	4.91D-01
35,25,19, 5	-60.8	8.20D-04	1.12D 02	9.64D-02
36,25,17, 0	-21.1	7.63D-04	1.04D 02	2.51D-01
36,25,18, 2	-28.5	1.17D-03	1.60D 02	2.88D-01
37,25,18, 1	-24.2	1.21D-03	1.65D 02	3.47D-01
38,25,19, 2	-28.5	1.08D-03	1.48D 02	2.66D-01
39,25,19, 1	-24.2	7.54D-04	1.03D 02	2.16D-01
39,25,22, 7	-245.7	8.67D-04	1.18D 02	2.55D-02
40,25,20, 2	-28.5	8.43D-04	1.15D 02	2.06D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 66-16D

S = 12.5 REV./DAY PERIGEE HEIGHT = 1303. KM.

A = 1.228800 E.R. E = 0.0200 I = 100.90 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
25,25,11, -1	106.5	2.64D-03	3.61D 02	1.82D-01
25,25,12, 1	48.9	1.32D-03	1.81D 02	2.00D-01
26,25,11, -2	259.0	2.21D-03	3.02D 02	6.23D-02
26,25,12, 0	67.0	1.03D-02	1.41D 03	1.13D 00
27,25,11, -3	-599.6	8.66D-04	1.18D 02	1.05D-02
27,25,12, -1	106.5	4.46D-03	6.09D 02	3.07D-01
27,25,13, 1	48.9	9.71D-04	1.33D 02	1.47D-01
28,25,12, -2	259.0	1.92D-03	2.62D 02	5.41D-02
28,25,13, 0	67.0	1.75D-03	2.40D 02	1.93D-01
30,25,13, -2	259.0	8.36D-04	1.14D 02	2.36D-02
30,25,14, 0	67.0	2.61D-03	3.57D 02	2.88D-01
31,25,14, -1	106.5	8.52D-04	1.17D 02	5.88D-02
32,25,15, 0	67.0	1.25D-03	1.71D 02	1.38D-01
33,25,15, -1	106.5	7.32D-04	1.00D 02	5.05D-02

CUTOFF: 100 METERS, TRANSVERSE

SATELLITE 66-70A

S = 10.5 REV./DAY PERIGEE HEIGHT = 369. KM.

A = 1.373900 E.R. E = 0.2300 I = 81.40 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
21,21, 8, -3	16.8	1.23D-03	1.89D 02	7.42D-01
21,21, 9, -1	14.6	4.65D-03	7.10D 02	3.24D 00
21,21,10, 1	12.9	4.85D-03	7.41D 02	3.85D 00
21,21,11, 3	11.5	1.42D-03	2.17D 02	1.27D 00
22,21,10, 0	13.7	1.82D-03	2.78D 02	1.36D 00
22,21,11, 2	12.2	2.53D-03	3.87D 02	2.14D 00
22,21,12, 4	11.0	7.08D-04	1.08D 02	6.71D-01
23,21,10, -1	14.6	2.34D-03	3.59D 02	1.64D 00
23,21,11, 1	12.9	1.18D-03	1.80D 02	9.42D-01
24,21,11, 0	13.7	1.63D-03	2.49D 02	1.22D 00
24,21,12, 2	12.2	1.48D-03	2.27D 02	1.26D 00
25,21,11, -1	14.6	1.42D-03	2.17D 02	1.00D 00
25,21,13, 3	11.5	6.94D-04	1.06D 02	6.28D-01
26,21,12, 0	13.7	1.30D-03	1.98D 02	9.78D-01
26,21,13, 2	12.2	6.71D-04	1.03D 02	5.75D-01
27,21,12, -1	14.6	8.76D-04	1.34D 02	6.20D-01
28,21,13, 0	13.7	9.64D-04	1.47D 02	7.32D-01
30,21,14, 0	13.7	6.78D-04	1.04D 02	5.17D-01

CUTOFF: 100 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 66-34C

S = 9.5 REV./DAY PERIGEE HEIGHT = 283. KM.

A = 1.471000 E.R. E = 0.2900 I = 82.40 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
19,19, 7, -3	58.7	1.90D-02	3.11D 03	3.74D 00
19,19, 8, -1	40.3	4.61D-02	7.54D 03	1.33D 01
19,19, 9, 1	30.7	3.95D-02	6.47D 03	1.51D 01
19,19,10, 3	24.7	1.12D-02	1.83D 03	5.33D 00
20,19, 7, -4	76.2	9.78D-03	1.60D 03	1.48D 00
20,19, 8, -2	47.8	1.28D-02	2.09D 03	3.11D 00
20,19, 9, 0	34.8	8.38D-03	1.37D 03	2.81D 00
20,19,10, 2	27.4	1.68D-02	2.76D 03	7.24D 00
21,19, 6, -7	700.1	1.16D-02	1.90D 03	1.89D-01
21,19, 9, -1	40.3	2.38D-02	3.90D 03	6.90D 00
21,19,10, 1	30.7	1.38D-02	2.26D 03	5.29D 00
22,19, 8, -4	76.2	7.34D-03	1.20D 03	1.11D 00
22,19, 9, -2	47.8	9.96D-03	1.63D 03	2.43D 00
22,19,10, 0	34.8	8.73D-03	1.43D 03	2.94D 00
22,19,11, 2	27.4	1.14D-02	1.87D 03	4.92D 00
23,19, 7, -7	700.1	1.00D-02	1.64D 03	1.63D-01
23,19,10, -1	40.3	1.55D-02	2.53D 03	4.49D 00
24,19,10, -2	47.8	7.17D-03	1.17D 03	1.75D 00
24,19,11, 0	34.8	7.98D-03	1.31D 03	2.69D 00
24,19,12, 2	27.4	6.64D-03	1.09D 03	2.87D 00
25,19,11, -1	40.3	1.07D-02	1.75D 03	3.10D 00
26,19,12, 0	34.8	6.84D-03	1.12D 03	2.31D 00
27,19,12, -1	40.3	7.49D-03	1.23D 03	2.18D 00
33,19,12, -7	700.1	6.44D-03	1.05D 03	1.05D-01
35,19,13, -7	700.1	6.70D-03	1.10D 03	1.10D-01
37,19,14, -7	700.1	6.32D-03	1.03D 03	1.03D-01

CUTOFF: 1000 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 66-34A

S = 9.5 REV./DAY PERIGEE HEIGHT = 282. KM.

A = 1.470800 E.R. E = 0.2900 I = 82.40 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
19,19, 7, -3	47.8	1.26D-02	2.06D 03	3.05D 00
19,19, 8, -1	34.8	3.45D-02	5.64D 03	1.15D 01
19,19, 9, 1	27.4	3.15D-02	5.16D 03	1.35D 01
19,19,10, 3	22.6	9.31D-03	1.52D 03	4.88D 00
20,19, 7, -4	58.8	5.83D-03	9.54D 02	1.15D 00
20,19, 8, -2	40.3	9.09D-03	1.49D 03	2.63D 00
20,19, 9, 0	30.7	6.50D-03	1.06D 03	2.48D 00
20,19,10, 2	24.8	1.38D-02	2.25D 03	6.56D 00
20,19,11, 4	20.7	4.42D-03	7.23D 02	2.53D 00
21,19, 8, -3	47.8	3.92D-03	6.43D 02	9.54D-01
21,19, 9, -1	34.8	1.78D-02	2.92D 03	5.98D 00
21,19,10, 1	27.4	1.10D-02	1.81D 03	4.74D 00
22,19, 8, -4	58.8	4.37D-03	7.16D 02	8.62D-01
22,19, 9, -2	40.3	7.09D-03	1.16D 03	2.05D 00
22,19,10, 0	30.7	6.77D-03	1.11D 03	2.60D 00
22,19,11, 2	24.8	9.33D-03	1.53D 03	4.46D 00
23,19,10, -1	34.8	1.16D-02	1.89D 03	3.90D 00
23,19,11, 1	27.4	3.70D-03	6.06D 02	1.60D 00
23,19,12, 3	22.6	3.45D-03	5.65D 02	1.82D 00
24,19, 9, -4	58.8	3.20D-03	5.24D 02	6.32D-01
24,19,10, -2	40.3	5.10D-03	8.35D 02	1.48D 00
24,19,11, 0	30.7	6.19D-03	1.01D 03	2.38D 00
24,19,12, 2	24.8	5.42D-03	8.88D 02	2.60D 00
25,19,11, -1	34.8	7.98D-03	1.31D 03	2.69D 00
25,19,13, 3	22.6	3.06D-03	5.02D 02	1.62D 00
26,19,11, -2	40.3	3.52D-03	5.76D 02	1.02D 00
26,19,12, 0	30.7	5.30D-03	8.68D 02	2.04D 00
27,19,12, -1	34.8	5.60D-03	9.16D 02	1.89D 00
28,19,13, 0	30.7	4.34D-03	7.10D 02	1.68D 00
29,19,13, -1	34.8	3.90D-03	6.39D 02	1.32D 00
30,19,14, 0	30.7	3.41D-03	5.59D 02	1.32D 00

CUTOFF: 500 METERS, TRANSVERSE

TABLE 4(Continued)

SATELLITE 64-6A

S = 8.5 REV./DAY PERIGEE HEIGHT = 400. KM.

A = 1.586100 E.R. E = 0.3300 I = 60.80 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
17,17, 7, -1	-27.4	6.40D-03	1.13D 03	3.14D 00
17,17, 8, 1	-26.4	4.34D-03	7.66D 02	2.20D 00
18,17, 7, -2	-27.9	6.74D-03	1.19D 03	3.24D 00
18,17, 8, 0	-26.9	1.14D-02	2.01D 03	5.68D 00
18,17, 9, 2	-26.0	5.25D-03	9.27D 02	2.71D 00
19,17, 8, -1	-27.4	9.93D-03	1.75D 03	4.85D 00
19,17, 9, 1	-26.4	1.22D-02	2.16D 03	6.18D 00
19,17,10, 3	-25.5	4.06D-03	7.18D 02	2.12D 00
20,17, 9, 0	-26.9	9.88D-03	1.74D 03	4.90D 00
20,17,10, 2	-26.0	9.42D-03	1.66D 03	4.84D 00
21,17,10, 1	-26.4	7.25D-03	1.28D 03	3.65D 00
21,17,11, 3	-25.5	5.74D-03	1.01D 03	2.99D 00
22,17, 9, -2	-27.9	2.86D-03	5.05D 02	1.37D 00
22,17,11, 2	-26.0	4.15D-03	7.32D 02	2.12D 00
22,17,12, 4	-25.1	2.91D-03	5.15D 02	1.54D 00
23,17,10, -1	-27.4	3.44D-03	6.08D 02	1.67D 00
23,17,11, 1	-26.4	3.19D-03	5.64D 02	1.61D 00
24,17,11, 0	-26.9	3.17D-03	5.59D 02	1.56D 00
24,17,12, 2	-26.0	2.86D-03	5.05D 02	1.46D 00

CUTOFF: 500 METERS, TRANSVERSE

SATELLITE 67-40C

S = 0.5 REV./DAY PERIGEE HEIGHT = 10199. KM.

A = 10.396200 E.R. E = 0.7500 I = 35.60 DEG.

USING KOZAI MEAN MOTION FORMULA

L, M, P, Q	BEAT PERIOD (DAYS)	CENTRAL ANGLE (DEGREES)	TRANSVERSE (METERS)	DELTA A (METERS)
3, 1, 1, 1	70.6	1.34D-03	1.56D 03	3.04D 01
3, 1, 2, 3	71.1	1.75D-03	2.03D 03	3.95D 01
2, 2, 0, 2	35.3	6.64D-03	7.69D 03	2.90D 02
2, 2, 1, 4	35.4	5.35D-03	6.19D 03	2.39D 02
3, 2, 1, 3	35.4	2.59D-03	3.00D 03	1.17D 02
3, 3, 1, 5	23.6	8.94D-04	1.03D 03	6.05D 01

CUTOFF: 1000 METERS, TRANSVERSE

Table 5
Comparison of 2 Day Resonant Perturbations Due to $J_{28,27}$

Satellite	Orbit Period (min.)	Inclination* (Degs.)	Beat Period (Days)	Nominal Effect on Orbit (meters)**	
				Anderle[3]	This Report
1963 - 49B	107.1	89.94	4.9	5.0	5.8
1965 - 48A	106.9	89.98	6.6	9.5	11.3
1965 - 109A	105.1	89.11	-3.4	4.6	3.5

*Inclinations as of October 1966.

**Transverse perturbation $a\Delta M$ including only the quadratic divisor term in ΔM. Effect calculated with $\bar{J}_{28,27} = 10^{-8}$.