NASA TECH BRIEF

Marshall Space Flight Center

Study-Simulation of Space Station Dynamics

The problem:

To mathematically simulate the structural/control system/environmental interaction problem for large flexible spacecraft. Sufficiently general equations for such a system do not exist because of the numerous possible representations and the uncertain complexity of a particular configuration.

The solution:

The matrix algebra translator and executor (MATE) which takes the equations describing the system components and loads them directly into the computer. The computer then programs itself.

How it's done:

The translator program of the MATE system functions as a compiler that reads the equations, devises a computing sequence from the equations, and then generates the machine instructions required to perform the computing sequence.

The executor takes the sequence of elementary matrix and vector operations generated by the compiler and performs the actual numerical processing. The executor also performs data management and bookkeeping services. It monitors the current size and type of all matrices defined in the problem, manages the core resources of the computer, and automatically goes to auxiliary external storage devices when the core is full.

Notes:

1. This program is written in FORTRAN IV for use on the IBM-7094 computer, and may easily be adapted for use on other systems.
2. Requests for further information may be directed to:

    COSMIC
    112 Barrow Hall
    University of Georgia
    Athens, Georgia 30601
    Reference: B71-10382

Patent status:

No patent action is contemplated by NASA.

Source: M. J. Gaitens of
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Category 09