

# NASA TECH BRIEF

## *Goddard Space Flight Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D. C. 20546.

### Optical Design Computer Program: LENS II

**The problem:**

The evaluation of optical lens designs requires the consideration of several complex factors.

**The solution:**

A differential-correction lens design program (LENS II) has been written which evaluates optical lens design.

**How it's done:**

The criterion which the program uses for the evaluation of optical lens design progress is basically a path length criterion. Hamilton's angle-characteristic function is used in the development of the set of image-defect items used by the program. The coordinate systems, in terms of which the angle characteristic is represented, have their origins at the center of the entrance pupil for the object space coordinates and at the Gaussian image point for the image space coordinates.

The function which specifies the performance of the lens relative to image quality incorporates the angle characteristic, which is a function of aperture coordinates, field coordinate, and wavelength. An

integral is taken over the vignetted aperture (a two-dimensional region), the field, and the wavelength interval. This function has the requisite mathematical properties (i.e., a sum of squares) of a proper defect function for an automatic lens design program and is closely related to the Strehl definition of image quality. LENS II is considered a powerful differential-correction lens design program.

**Notes:**

1. The program is written in FORTRAN IV for the IBM 360 H compiler and may be compiled under option 0 or 2. Option 2 is recommended. The G-level compiler may also be used.
2. Inquiries concerning this program should be directed to:

COSMIC  
112 Barrow Hall  
University of Georgia  
Athens, Georgia 30601  
Reference: GSC-11951

Source: Computer Library  
(GSC-11951)

Categories: 03 (Physical Sciences)  
09 (Mathematics and  
Information Sciences)