NEW ORBITS FOR ENCELADUS AND DIONE BASED ON THE PHOTOGRAPHIC OBSERVATIONS

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ABSTRACT

A program is underway at the McDonald Observatory to extend the series of photographic observations of the satellites of the outer planets (Abbot, Mulholland and Shelus, A.J. 80, 1975), and concurrent theoretical studies have led to a new orbital theory for the resonant pair of satellites, Enceladus and Dione (Jefferys and Ries, A.J. 80, 1975). The construction of the new theory, using the computer software system TRIGMAN, has provided Fortran subroutines for the computation of the planetocentric coordinates of the two satellites, as well as partial derivatives for the orbit elements and certain other physical parameters of the orbit problem, including some of the harmonics of the gravitational field of Saturn. The available photographic observations for these two objects are currently being discussed with the new theory, and improved values of the orbital parameters are expected in the near future.

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