4.4 A Method For Determining the Masses of the Co-Orbiting Saturnian Satellites S10 and S11, C. F. Peters, Jet Propulsion Lab. Pasadena, Ca. 91103. The remarkable resonance configuration of S10 and S11 promises an accurate determination of their masses. A description is given of the parameters involved, and the expected results are discussed.

4.5 The Dynamics of the Saturnian Satellites 1980S1 and 1980S3, R. S. HARRINGTON & P. K. SEIDELMANN, USNO. - A planar model of the Saturnian satellite system has been numerically integrated to investigate the dynamics of the newly discovered satellites, 1980S1 and 1980S3. The orbits have approximately the same semi-major axis, but the difference in longitude librates between vales of approximately 6° and 354° in 3000 days. Thus the satellites never approach extreme proximity, and the orbits appear to be quasi-stable. Due to perturbations by the other satellites, various members of the family of tadpole/horseshoe periodic orbits seen in the restricted three-body problem appear to be exhibited by these two satellites.

4.6 A Redetermination of the Orbit of Triton, A.W. HARRIS, JPL - A machine-readable file of all astrometric observations of Triton from 1887 to the present has been compiled. Preliminary analysis of this data indicates that the motion of the plane of Triton's orbit implies an inclination of the orbit to Neptune's equator of $22^{\circ} \pm 3^{\circ}$, rather than the usually referenced value of 20°. This implies a somewhat lower value of the dynamical oblateness of Neptune, $J_2 = .0037 \pm .0004$. Very recent data from USNO-Flagstaff is of much higher quality than any previous observations and indicates an upper limit of the eccentricity of the orbit $e \lesssim 0.001$. Long arc solutions with the eccentricity so constrained are in progress. The semi-major axis can also be constrained by the mass of Neptune, now known to much higher precision than possible from observations of Triton's orbit. It is thus possible to evaluate the personal errors of the visual observers and apply appropriate corrections to their observations of separation such that they yield the correct orbit radius. Preliminary analysis of this systematic error source suggests that annual determinations of the orbit normal from these visual observation may be in error by as much as $\sim 0^{\circ}.5$, which may significantly bias results based on combinations of early, predominantly visual, and recent, predominantely photographic, observations.

This work was supported at JPL by NASA contract NAS 7-100.

4.7 Earth Rotation From a Simultaneous Reduction of LLR/LAGEOS Data. P. J. Shelus, R. J. Eanes, and N. R. Zarate, University of Texas - Single station LLR results for polar motion and length of day have long been available from several on-going projects at the University of Texas. With the increasing availability of internally consistent residuals of both LLR and LAGEOS data with respect to well-defined models over extended intervals of time, it seems appropriate that attempts be made to reduce simultaneously both types of data taking advantages of the strengths of each while eliminating the weaknesses. Two parallel studies are the result: A.) Simultaneous Earth Rotation solutions using the SLR analysis package at the University of Texas: B.) The same using the LLR analysis package. This presentation will discuss the first results obtained with the LLR analysis package, together with a discussion of the problems encountered in its implementation. Also to be presented will be a preliminary assesment of the suitability of such a simultaneous data reduction for a quick turnaround Earth Rotation service.

4.8 The Period of Charon, Derived from the Observed Barycentric Motion of Pluto, T. C. van Flandern and K. F. Pulkkinen, US Naval Obsy, and J. Ries and R. L. Duncombe, U.T. Austin.

Analysis of the observations of Pluto from 1930 through 1979 indicate a motion of the center of light of the Pluto-Charon system with respect to the barycenter of the system having a period of 6.3871 ±.0002 days and an amplitude of $0''.07$. The observations of Pluto from 1930 to 1979, compared to a numerical integration of Pluto's orbit were furnished to UT by the Naval Observatory. After removal of a cubic term, the δ residuals were analyzed at several σ levels. At the Naval Observatory, the same observations were compared to an improved orbit of Pluto and the δ residuals analyzed independently. The results of the two analyses were consistent within the error quoted. Results of an error analysis of simulated data by Monte Carlo techniques are presented.

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