Observatório Nacional

Disciplina: ORBIT DETERMINATION OF SOLAR SYSTEM OBJECTS

Código: AST-E12

Tipo: Eventual

Créditos: 02

Programa:

Summary of celestial mechanics: Two-body problem, 3-body problem, N-body problem, perturbations of motion, osculating elements.

Numerical integration: Principle of numerical integration, Euler method, order of method, 2nd order method, consistency, convergence and stability of methods, Runge-Kutta, Gauss-Radau, Bulirsch-Stoer.

Astrometry and measurements: Astrometrical observations, Radar measurements. Reference frame, light-time correction, aberration correction.

Orbit determination: Preliminary orbit (Gauss method, Laplace method, Vaisala method, Statistical ranging), Fitting process (least-squares method). - Orbit uncertainty Propagation of the covariance matrix, Monte Carlo process. Applications (Near-Earth objects, lost asteroids, ...).

Bibliografia:

Fox K., Numerical integration of the equations of motion of celestial mechanics, Celestial Mechanics, 33, 127, 1984

E. Everhart. An efficient integrator that uses Gauss-Radau spacings. In Dynamics of Comets : Their Origin and Evolution, volume 83 of Proceeding of IAU Colloq., 1985. 25 Books:

Seidelmann, P. K. (Ed.). (2005). Explanatory Supplement to the Astronomical Almanac: A Revision to the Explanatory Supplement to the Astronomical Ephemeris and the American Ephemeris and Nautical Almanac. University Science Books.

Danby J. M. A., Fundamentals of celestial mechanics . Richmond : Willman-Bell, 2nd ed., 1992.