ABSTRACT ONLY

QUALITATIVE ANALYSIS OF THE DYNAMICAL EVOLUTION OF PLANETARY SYSTEMS

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Discoveries of extrasolar planetary systems have shown that the configuration of our Solar System is an exception to the rule given the number of systems with high relative inclinations, large eccentricities and high mass planets in orbits with periods of hours. Due to these peculiar characteristics, our goal is to understand the processes that led planetary systems to acquire such characteristics, through mutual gravitational interaction and with the protoplanetary disk. To verify the quality of the observational data and the stability of the planetary systems in periods of at least 1 Myr, we use the concepts of Hill Stability (Marchal & Bozis (1982) and Gladman (1993)) that consider the configuration of the systems in terms of total energy and orbital angular momentum; to evaluate their secular movements we work with the construction of Representative Plans that bring with them information of the long-period behavior of the system, based only on the mass ratio of the planets and the ratio of their semi-major axes; To analyze the temporal evolution, we use the theory of semi-analytical perturbation (Michtchenko & Malhotra, 2004) that allows us to explore systems of high eccentricities by not working with series expansions of the Disturbing Function. We work with models that simulate the process of planetary migration (Michtchenko & Rodríguez, 2011), which change the orbital elements in a forced way, seeking to relate the migration trajectories with known processes, interaction of the planet with proto planetary disk, accretion of matter and tidal effects. Using the stability criteria, we selected some planetary systems to start the analysis and, after verifying their secular behavior, we started the simulations of migratory processes to understand through which configurations the system passed until arriving in the current state, considering only the variation of the total energy of the system and the orbital angular momentum.