ON THE HECUBA GAP

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Several recent results point to chaotic diffusion of the orbits as the main mechanism in the origin of all Kirkwood gaps. However, in the case of the 2/1 Kirkwood gap, it has not yet been possible to have a complete identification of these mechanisms This situation is due essentially to the fact that the time scale of evolutionary chaotic processes at work in this resonance are of the order of the age of the Solar System. The results presented in this communication were obtained with Hadjidemetriou's mapping modified to use almost local expansions valid in high eccentricities and to take into account the main perturbations of Jupiter's orbit. This mapping allows simulations over 1 Gyr in short calculation times, In order to accelerate the diffusion processes the models were scaled. The scaling is done by means of a mass gauge introduced into the equations in such a way that all frequencies are almost equally scaled so that the resonant structure of the averaged system is not altered. The results points to the diffusion to high eccentricities of all orbits starting in the middle of the resonance, even when only a planar model is considered. They also show that a decisive role is played by the perturbations in Jupiter's orbit associated with the angles $\lambda_{Jup} - 2\lambda_{Sat}$ and $2\lambda_{Jup} - 5\lambda_{Sat}$.