## ON A GLOBAL EXPANSION OF THE DISTURBING FUNCTION IN THE PLANAR ASTEROIDAL PROBLEM

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Starting with a simple Taylor-based expansion of the inverse of the distance between two bodies, we are able to obtain a series expansion of the disturbing function of the three-body problem (planar elliptic case) which is valid for all points of the phase space outside the immediate vicinity of the collision points. In particular, the expansion is valid for very high values of the eccentricity of the perturbed body. Furthermore, in the case of an interior mean-motion resonant configuration (i.e., $a < a_1$), the above-mentioned expression is easily averaged with respect to the synodic period, yielding once again a global expansion of $\langle R \rangle$ valid for very high eccentricities.

Comparisons between these results and the numerically computed exact function are presented for various resonances and values of the eccentricity. Maximum errors are determined in each case and their origin is established. Lastly, we discuss the applicability of the present expansion to practical problems.

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## CAPTURE CONDITIONS IN THE RESTRICTED THREE-BODY PROBLEM

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The capture regions for planetary satellites are numerically explored in the frame of the restricted tree-body problem. Appropriate scaling relations for describing capture conditions in terms of $\mu$ are provided in the bidimensional problem.

Also the tridimensional problem is considered and capture regions completely characterized for Jupiter, Uranus and the Earth.

A discussion is given of conditions leading to capture when the planetary eccentricity is taken into account.

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## LANGMUIR INSTABILITIES IN THE SOLAR WIND

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The development of the anisotropy of the electron distribution function in the lower solar corona has been studied through a test-particle model, revealing that particles with parallel velocities greater than $5v_e$ (where $v_e$ is the thermal velocity) will eventually run away due to the magnetic pumping effect. The scaling with the parallel velocity of the parallel distribution function and of the perpendicular temperature is also derived. The theory shows a suprathermal tail originated near the coronal base that dominates the energy flux at distances of about $4\ R_\odot$.

We have used this parametrized distribution function to investigate the high frequency stability of the runaway electrons. From the test-particle model it is found that the electron function is unstable for runaway electrons, but becomes stable as we approach to the critical velocity ($\simeq 5\ v_e$) that separates runaway from thermalized particles. This behavior is to a large extent uncorrelated with the perpendicular temperature profile.

Stability against generalized Langmuir waves has also been examined. It is found that the distribution is appreciably more stable against these modes as we go to larger heliocentric distances. Only near the base of the solar corona ($r \simeq 1\ R_\odot$) can the magnetized Langmuir waves be a source of instability. This result suggests that high-energy electron tails can enhance the growth rate of cyclotron instability only in this region.

The above mentioned results suggest that the dissipation of Langmuir waves may contribute, to some extent, to the coronal heating. If these waves are generated in the lower solar corona and they are not readily dissipated as they travel away from the base, then observation of them, or of phenomena related to them, becomes a possibility. The role of suprathermal electrons in the electronic heat flux should therefore be regarded as of fundamental importance. The mechanism by which this amount of energy can be transported and deposited is being studied in a subsequent work.

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