problems associated with lagrange's planetaby equation

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This thesis studies two mainplanetary equations; in the theory ofin the three-body problem.The problem of the analytical theory of Earth's artificialsatellites for the zonal harmonic perturbations was treated usingthe CUI nOU-XING technique [10], to obtain the first and secondorder perturbations in the orbital elements. The expressionsobtained include the effects produced by the second up to sixthapplications of Lagrange'sartificial satellites andzonal harmonics. The secular terms of the first and second orderand the periodic terms of the first order are obtained. Tnesolution is set free from any mixed secular terms.Numerical examples, in which the values of the orbitalelements for two different satellite~used to compare our analyticalsolution of the perturbations in the orbital elements withthose given by Slowey [65] and Susanna [72]. For the Balloonsate 11ite 1963, 30n, [65.1 the values of the orbital elements atthe beginning, middle of the lifetime of the Balloon, and nearthe decay were given. A comparison was made between our resultsand those obtained by Slowey at these intervals. For the Pageos1 Balloon satellite the values of the orbital elements at thebeginning, middle of the first two years of the lifetime and nearthe end of the second year of the satellite's lifetime weregiven. A comparison was made between our results and thoseobtained by Susanna at these intervals. These comparisons,sho'il"that our analytical solution and computation agree convenientlywith the results given by Slowey and Susanna.The quintic equation appearing in the stationary solution ofthe three-body problem, namelY, Lagrange's equation, was solvedfor a set of distances. between three collinear masses m, ml andmusing Ioakimidis method [36J. Also a verification of thissolution in the solar system with nume r i ce I examples on differentco:.l inear planets was given. Finally, a comparison of ther-e.su l ts obtained in this thesis with those tabulated in theNautical and Astronomical Almanac was illustr-ated.