

THEORETICAL AND OBSERVATIONAL EFFORTS IN ORDER TO OBTAIN HIGH PRECISION POSITIONS OF THE GALILEAN SATELLITES OF JUPITER (*)

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ABSTRACT. The two manners to improve the knowledge of the motions of the galilean satellites are the elaboration of a new theory and the use of high precision observations. In this paper, we present new results on these subjects.

We have applied the Sagnier's method in order to get a new theory of the motions and we describe here the second approximation which leads to a third order solution. In this solution appear coupled terms in longitude of the perijoves and longitudes of the nodes. The de Haerdtl's inequalities, which come from the 3-7 commensurability between satellites 3 and 4 are included in this solution. These developments, first computed by de Heardtl, have been improved by Lieske (1973). In our solution we introduce the use of the variables in inclination, and some new terms appear.

In order to get the best precision for the final ephemerides, the accuracy of the observations have to be improved: best results may be obtained with the use of the observations of mutual events. Simulations have shown the interest to take into account the variations of the albedo as a function of geographic longitudes and latitudes on the satellites themselves. So, the theoretical flux of light is closer to the observed one and the accuracy is improved. In 1985, mutual events occur and we have organized a campaign in order to obtain results of high precision.

REFERENCE

Lieske, J.H., 1973, *Astron. and Astrophys.*, 27, 59.

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