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On a process for obtaining a new set of homogeneous differential equations of the three-body problem

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Abstract: I have reported in the *Information Bulletin for the Southern Hemisphere* (1971) that the differential equations of relative motion of the three-body problem can be brought to an homogeneous form. I have elsewhere shown that this can be achieved by transforming the secondary accelerations of the original set of equations by means of the following process:

$$(1) \qquad \Delta = \lim\ (P_1T + TB + BD + DF + FH + \ldots)$$

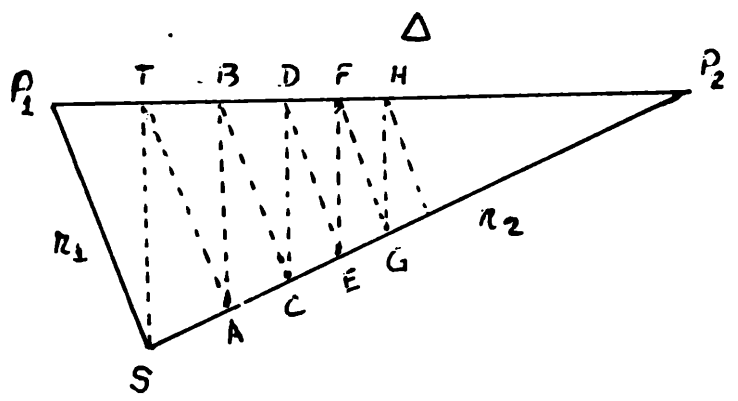

Fig. 1 — Geometric configuration of the three-body problem at some arbitrary time t. ST, BA, CD, EF, ... are perpendicular to the side Δ. AT, CB, ED, GF, ... are the corresponding parallels to the side r_1.

In this expression every term into brackets is a function of the sides of the triangle. The process for transforming the secondary accelerations can now be justified in the light of the theory of sets. In fact, if we consider P_1T, TB, BD, DF, ... as closed intervals of points, the corresponding functions which give the value of each one of the closed intervals are bounded.

This must necessarily occur according to theorems by Heine concerning the uniform convergence of a function f (x) over a closed interval of points and Bolzano-Weierstrass' concerning the existence of a limiting point in a bounded linear set of points. These statements assure the validness of the whole set of operations performed for obtaining the new equations of motion.

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Colisiones en el problema restringido de cuatro cuerpos

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Resumen: Se estudia numéricamente el caso particular de una colisión triple en el problema restringido de cuatro cuerpos.