Chaotic Amplification in the Relativistic Restricted Three-body Problem

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The relativistic equations of motion for the restricted three-body problem are derived in the first post-Newtonian approximation. These equations are integrated numerically for seven different trajectories in the earth-moon orbital system. Four of the trajectories are determined to be chaotic and three are not chaotic. Each post-Newtonian trajectory is compared to its Newtonian counterpart. It is found that the difference between Newtonian and post-Newtonian trajectories for the restricted three-body problem is greater for chaotic trajectories than it is for trajectories that are not chaotic. Finally, the possibility of using this *Chaotic Amplification Effect* as a novel test of general relativity is discussed.

Key words: Relativistic Restricted Three-body Problem; Relativistic Dynamics; Gravitation.