

Non-integrability of the planar elliptic photo-gravitational Hill problem.

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We prove that the elliptic photo-gravitational Hill problem is not integrable except in one case, when the gravitational force of the lighter primary acting on the infinitesimal mass is balanced by the radiation-pressure force of this primary. In this exceptional case, the infinitesimal mass moves under the influence of the more massive primary localised at infinity. We show that in this case the equations of motion are integrable and can be solved explicitly in terms of elementary functions. Moreover, we distinguish a three-dimensional subspace of initial conditions for which the solutions are periodic and the corresponding orbits are algebraic curves defined by a polynomial of degree four. All of them are of genus zero.

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