

A limit case of the planar $n + 1$ ring problem

Abstract. We study the dynamics of an idealized model of a planetary ring. We start with the $n + 1$ ring problem in a rotating coordinate system where an infinitesimal mass is attracted by n small masses m located in a regular n -gon around a central mass m_0 . Assuming the mass ratio m_0/m of order n^3 , we construct a limiting problem as n tends to infinity. This limit process is similar to Hill's problem. The central mass is pushed towards the infinity while the distances between two consecutive ring bodies is kept equal 1. We study the dynamics of the problem including equilibria, periodic orbits and stability.