

Abstract

It is well known that in a relative equilibrium of the classical N-body problem, the masses are rotating uniformly around its center of mass, which is fixed at the origin. They behave as a rigid body. The big difficulty to study relative equilibria on the sphere, that we call RE by short, is the absence of the center of mass as first integral. Without the center of mass we do not know how to determine the rotation axis. In this talk I will show a geometrical method to study RE on the sphere, when the masses are moving under the influence of a general potential which only depends on the mutual distances among the masses. For simplicity, we restrict our analysis to the case of the three-body problem on the sphere. We divide the relative equilibria in two families: Collinear or Euler RE, if the three masses are on the same geodesic for all time; and Lagrange RE if this is not the case. We show new families of RE on the sphere for the cotangent potential (the natural extension of the Newtonian potential to the sphere), and we will pose some open problems.