

Relative Equilibria in the Restricted Curved Three-Body Problem

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Abstract. We consider the circular restricted three-body problem in 2D spaces of constant curvature. Our work investigates existence and stability of relative equilibria (RE) which generalise the Lagrange libration points L_1, \dots, L_5 to the case of nonzero curvature. In our approach, we fix the Riemannian distance between the primaries and study the behaviour of the RE in terms of the mass ratio of the primaries and the curvature. This approach clarifies the underlying geometry and allows us to recover and extend previous results obtained by Martinez and Simò (2017) in simpler terms. We first show how the compactness of the 2D sphere leads to the existence of new RE for positive curvature. We then show how positively curving the space yields larger ranges of stability for L_4 and L_5 and may also stabilise other RE. This is work in progress in collaboration with Luis C. García-Naranjo.