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Curving Lagrange points: more equilibria, more stability

We study the relative equilibria of the restricted circular three-body problem in two-dimensional spaces of constant curvature, which generalize the Lagrangian points $L_1, \ldots, L_5$. Fixing the Riemannian distance between the primaries, we provide rigorous proofs of phenomena observed numerically by Kilin (1999) and Martínez and Simó (2017). In positive curvature, new equilibria arise alongside the classical ones, whose existence is enforced by the compactness of the sphere. Finally, we show that positive curvature enlarges the range of mass ratios for which L_4 and L_5 are elliptic, and that one of the new equilibria is Lyapunov stable. This is joint work with Luis C. García-Naranjo and Miguel Ayala.