

Abstract Submitted
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Precession and chaos in the Newtonian two-body problem in a spherical universe MARTHA I. ROSEBERRY, JOHN F. LINDNER, Physics Department, The College of Wooster, Wooster OH 44691 — We generalize the Newtonian two-body problem from flat space to spherical space and realize much of the complexity of the three-body problem with only two bodies. We show analytically, by perturbation theory, that small, nearly circular orbits precess at rates proportional to the square root of their initial separations and inversely proportional to the square of the universe's radius. We show computationally, by creating initial velocity space plots of millions of orbits, that large orbits can exhibit extreme sensitivity to initial conditions, the signature of chaos. We acknowledge support from NSF-REU grant DMR 0243811.

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