

Review of: "Geodesics as Equations of Motion"

Simon Davis

Potential competing interests: No potential competing interests to declare.

The discussion of geodesics as equations of motion would reduce the number of hypotheses in the theory of general relativity. Geodesics are the least complex of trajectories in a curved space-time and a variational principle with a Lagrange multiplier term including the complexity would be sufficient to establish this result. Alternatively, an integral equal to the squared distance may be included with a Lagrange multiplier. The introduction of this topic by the author represents a worthwhile study in the literature. The problem on the absence of consistency between the astronomical observations in a standard coordinate time and the affine parameter in the geodesic equation is resolved generally through compatible definitions of the space-time variables and the differential equation for $u=1/r$ in terms of ϕ or an ellipse with an eccentricity. The motion is given usually by an equation for r in terms of t derived from the constancy of the energy, angular momentum and squared arc length. The vanishing variation of the last expression characterizes the geodesic and, therefore, any solution to the differential equation must be consistent with geodesic motion in space-time.