DAN OFFIN, Queen's University
Dynamics and Symmetry: Minimizing brake orbits

Reversible orbits play a special role in three body dynamics. Using Jacobi's version of the fixed energy variational problem, we prove that a geodesic in the Jacobi metric (JM) which touches the Hill boundary in two distinct points and which locally minimizes the energy functional (with certain restrictions) among curves which join at most two points on the boundary, but otherwise remain in the region where the JM is nondegenerate, correspond to hyperbolic periodic solutions of Newton's equations with energy E. This result holds in the nondegenerate case where the linearized equations have no periodic solutions other than the Hamiltonian vector field.