Abstract

For the classical N-body problem, Maderna and Venturelli proved the existence of hyperbolic motions with any positive energy constant, starting from any configuration and along any non-collision configuration.

We give a new and completely different proof for the above existence of hyperbolic motions. The central idea is that, via some geometric observation, we build up uniform estimates for Euclidean length and angle of geodesics of Mane's potential starting from a given configuration and ending at the ray along a given non-collision configuration. Indeed, our geometric approach works for a wide range of potentials.