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Tiancheng Ouyang* (ouyang@math.byu.edu), Department of Mathematics, Brigham Young University, Provo, UT 84602. *New Variational methods on n-body problem of celestial mechanics.*

In this talk, we will introduce our new methods of variational approach combining numerical simulation for N-body problem of celestial mechanics. By using these methods a series of new periodic orbits of N-body problems in \mathbb{R}^3 has been discovered; The numerical simulation and the rigorous analytic proofs of the existence of such orbits and stability are established. (Received September 24, 2012)