Dynamical Substitutes and Energy Surfaces in the Bicircular Sun-Earth-Moon System[1]

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An attempt has been established to explore the dynamics of the Sun−Earth−Moon bicircular model (BCM) system with dissipative forces. The proposed model of BCM in which the Sun is orbiting on the common center of the Sun−Earth−Moon system in clockwise direction. Perturbing effect by the motion of the Sun on the Lagrangian points, mechanical energy, and Jacobi integral are performed. We obtained the Lagrangian points L_1 and L_2 are perturbing periodically whereas the L_3 is not perturbed smoothly periodic but it performs a chaotic behavior in a bounded region. The geometric interpretation of time dependent pseudo potential energy of the proposed system is obtained, it is constant at some specific conditions otherwise it varies periodically with time. The conservation of mechanical energy, invariant relation of motion and forbidden region are performed. Thus, we conclude that the pervasive discussion of the BCM system describes a bridges gap between the Sun−Earth/Moon and the Earth−Moon system.

Keywords: N-body problem, restricted three-body problem, bicircular model, drag forces, equilibrium points, energy surfaces.