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Yiming Long* (longym@nankai.edu.cn), Chern Institute of Mathematics, Nankai University, Tianjin, 300071, Peoples Rep of China. *Stability of elliptic Lagrangian solutions of the classical three body problem via index theory.* Preliminary report.

Lagrange found his famous equilateral triangle solutions of the classical planar three body problem in 1772 which depend on the mass parameter and eccentricity of the ellipse. The linear stability of such solutions has been investigated by perturbation methods or numerical methods. But we are not aware of any rigorous analytical method which works for this problem in the full range of parameters. In this lecture, I shall give an introduction on the new rigorous analytical method and recent results jointly obtained by Xijun Hu, Shanzhong Sun and myself on this linear stability problem for the full range of the masses and eccentricity via index theories for symplectic matrix paths. (Received June 21, 2012)