1070-37-91 **Tiancheng Ouyang** and **Zhifu Xie*** (zxie@vsu.edu), Department of Mathematics & Computer Science, P.O.Box 9068, Virginia State University, Petersburg, VA 23806. *Number of Collinear Central Configurations.*

The motion of celestial body is described by a system of second order differential equations and it is called n-body problem. A central configuration plays the essential role in understanding the global structure of solutions of the n-body problem. A central configuration is an arrangement of the initial positions of masses that leads to special families of solutions of the n-body problem. There are different understandings of equivalence of central configurations in collinear n-body problem and we call them *permutation equivalence* and *geometric equivalence* when we count the number of central configurations. In the permutation equivalence, Euler found three collinear central configurations and Moulton generalized to $n!/2$ central configurations for any given mass m in the collinear n-body problem under permutation equivalence. In particular, the number of central configurations becomes from 12 under permutation equivalence to 1 under geometric equivalence for four equal masses. The main result in this paper is the discovery of the explicit parametric expressions of the union H_4 of the singular surfaces in the mass space (four distinct positive masses) which decrease the number of collinear central configurations under geometric equivalence. (Received February 01, 2011)