1065-70-33 **Tiancheng Ouyang** and **Zhifu Xie*** (zxie@vsu.edu), Department of Math. & Computer Science, P.O.Box 9068, Virginia State University, Petersburg, VA 23806. *Number of Central Configurations in the Collinear Four-body Problem.*

For a given $m = (m_1, m_2, \cdots, m_n) \in (\mathbf{R}^+)^n$, let p and $q \in (\mathbf{R}^d)^n$ be two central configurations for m. Then we call p and q *geometrically equivalent* and write $p \sim q$ if they differ by a rotation followed by a scalar multiplication as well as by a permutation of bodies. Denote by $L(n, m)$ the set of geometric equivalence classes of n-body collinear central configurations for any given mass vector m. There are other different understandings of equivalence of central configurations in collinear n-body problem. Under the usual definition of equivalence of central configurations in history, permutations of the bodies are not allowed and we call them *permutation equivalence*. In this case 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. 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 $m \in (\mathbf{R}^+)^4$. We prove that the number of central configurations ${}^{\#}L(4, m) = 4!/2 - 1 = 11$ if m_1, m_2, m_3 and m_4 are mutually distinct and $m \in H_4$. (Received August 06, 2010)