1014-57-845 **David G.C. Handron*** (handron@andrew.cmu.edu), Department of Mathematical Sciences, Carnegie Mellon University, Wean Hall 6113, Pittsburgh, PA 15237. *The Euler Characteristic of Graph Configuration Spaces.*

The graph configuration space $C_G(M)$ of a graph G in a manifold M is the space of all functions from the vertex set $V(G)$ into M, $\alpha : V(G) \to M$, with the restriction that $\alpha(v_1) \neq \alpha(v_2)$ whenever v_1 and v_2 are adjacent in G. There is a natural interpretation of this space as a subspace of the k-fold product $M^{\times k}$, where k is the number of vertices of G.

This paper is devoted to computing the Euler characteristic $\chi(C_G(M))$ of the graph configuration space $C_G(M)$. It is shown that $\chi(C_G(M))$ for any graph G is a polynomial function of $\chi(M)$. The expression is recursive, in that it may be expressed in terms of the Euler characteristics of the contractions of G.

The main tool used in this paper is Morse theory for stratified spaces. A stratified Morse function f is defined on the product $M^{\times k}$ in such a way that $-f$, when restricted to $C_G(M)$, is also a Morse function. A comparison of the critical points of f and $-f|_{C_G(M)}$ yields the desired result. Examples are computed for several families of graphs, including complete graphs, cyclic graphs and path graphs. (Received September 25, 2005)