1014-15-413 **Jason J Molitierno*** (molitiernoj@sacredheart.edu), Department of Mathematics, Sacred Heart University, 5151 Park Avenue, Fairfield, CT 06825-1000. *A Matrix Theory Approach to the Genus of a Graph.*

A graph $\mathcal{G}$ on n vertices can be represented as a Laplacian matrix L. Labelling the vertices of $\mathcal{G}$ from 1 to n, the matrix L is $n \times n$ where each diagonal entry $\ell_{i,i}$ is the degree of vertex i while the off-diagonal entries $\ell_{i,j}$ are -1 if vertices i and j are adjacent and 0 otherwise. The second smallest eigenvalue of L gives a measure of how connected $\mathcal{G}$ is. Hence this eigenvalue is termed as the algebraic connectivity of $\mathcal{G}$. Intuitively, a graph of higher genus is likely to have a larger algebraic connectivity. In this talk, upper bounds for the algebraic connectivity of graphs of genus k are derived, where k is a positive integer. Moreover, it is shown that for certain positive integers k, there does not exist a graph which achieves the upper bound. Finally, some surprising results are given for graphs of genus 0, i.e. planar graphs. (Received September 15, 2005)