1077-15-1548 **Jason J Molitierno*** (molitiernoj@sacredheart.edu), Department of Mathematics, Sacred Heart University, 5151 Park Avenue, Fairfield, CT 06825-1000. *The algebraic connectivity of graphs as a function of genus.*

The Laplacian matrix for a graph on n vertices labeled $1, \ldots, n$ is the $n \times n$ matrix whose i^{th} diagonal entry is the degree of vertex i, and the off diagonal entries (i, j) are -1 if vertices i and j are adjacent and 0 otherwise. Laplacian matrices are positive semidefinite, hence we can order the eigenvalues as $\lambda_1 \leq \lambda_2 \leq \ldots \lambda_n$. Since the row sums of the Laplacian matrix are each zero, it follows that $\lambda_1 = 0$ since the vector of all ones is a corresponding eigenvector. The eigenvalue λ_2 is a measure of how connected the graph is and is known as the algebraic connectivity. For example, the algebraic connectivity is zero if and only if the graph is disconnected. Moreover, if edges are added to an existing graph, the algebraic connectivity monotonically increases. In this talk, we investigate the algebraic connectivity of graphs in terms of their topological properties. We find upper bounds on the algebraic connectivities of graphs in terms of their genus. We also determine the conditions of when the upper bounds can and cannot be achieved. (Received September 20, 2011)