STEVENS Institute of Technology

Arthur E. Imperatore School of Sciences and Arts

Department of Mathematical Sciences

Seminar in Nonlinear Systems

Professor Lynne Doty

Department of Mathematics
Marist College

Towards Maximally Tough Nearly-Cubic Graphs

Thursday, November 21, 2002
3:30 pm
Pierce 218

Abstract: Toughness was originally introduced by Chvàtal in hopes of providing insights into the structure of Hamiltonian graphs. Because toughness is a measure that combines the size of disconnecting vertex set S with the number of components in $G \setminus S$, it is useful as well in the study of invulnerability of graphs modelling vertex failure in networks. In this context, we compute the maximum possible toughness among graphs with n vertices and $\lceil 3n/2 \rceil$ edges. The well-known upper bound $3/2$ can be achieved only when $n \equiv 0$ or $5 \bmod 6$. For each $n \geq 13$ with $n \equiv 1, 2, 3$ or $4 \bmod 6$, we construct a graph $G(n)$ on n vertices and $\lceil 3n/2 \rceil$ edges with toughness $\frac{3\lfloor n/6 \rfloor + 1}{2\lfloor n/6 \rfloor + 1}$. This toughness value, which asymptotically approaches $3/2$, is shown to be the maximum possible.

This is joint work with Kevin Ferland, of Bloomsburg University.

Refreshments at 3:15pm