Meeting: 1006, Lubbock, Texas, SS 12A, Special Session on Graph Theory

1006-05-143 **Ken-ichi Kawarabayashi** and **Michael D. Plummer*** (michael.d.plummer@vanderbilt.edu), Department of Mathematics, Vanderbilt University, Nashville, TN 37240, and **Akira Saito**. *Domination in a graph with a 2-factor.*

The cardinality of any smallest dominating set in a graph G is called the *domination number* of G and denoted by $\gamma(G)$. In 1996, Reed proved that every graph G of minimum degree at least three satisfies $\gamma(G) \leq (3/8)|V(G)|$ and conjectured that if G is a connected cubic graph, then $\gamma(G) \leq \lceil |V(G)|/3 \rceil$.

Theorem: Let G be a connected graph with a 2-factor F and let k be any positive integer. If F has at least two components and the order of each component is at least $3k$, then

$$\gamma(G) \leq \left(\frac{3k+2}{9k+3}\right)|V(G)|.$$

Corollary: Let k be any positive integer. Then every 2-edge-connected cubic graph of girth at least $3k$ satisfies

$$\gamma(G) \leq \left(\frac{3k+2}{9k+3}\right)|V(G)|.$$

Note that for girth at least nine, this implies that $\gamma(G) \leq (11/30)|V(G)|$, which improves Reed's $(3/8)|V(G)|$ bound. (Received February 12, 2005)