Deng, Hanyuan; Huang, Yuanqiu

Maximum genus, dominate number and girth of a graph. (Chinese. English summary)


Summary: It is known that the maximum genus of a connected graph is 
$$\left(\beta(G) - \xi(G)\right)/2,$$ where 
$$\beta(G) = |E(G)| - |V(G)| + 1$$ is the cycle rank of \(G\) and \(\xi(G)\) is the Betti deficiency of \(G\). This paper establishes 
an upper bound on the Betti deficiency \(\xi(G)\) in terms of the dominate number as well as girth of \(G\), and thus gives a lower bound on the maximum genus. It is shown that both the bounds are best possible, and better than the results for some graphs in previous papers.

MSC:

05C35 Extremal problems in graph theory

Keywords:

maximum genus; cycle rank; Betti deficiency; bound; dominate number; girth