

EIGENVALUE MULTIPLICITY IN REGULAR GRAPHS

Peter Rowlinson

Mathematics and Statistics Group
Division of Computing Science and Mathematics
University of Stirling
Scotland FK9 4LA

Consider a connected r -regular graph G of order n with μ as an eigenvalue of multiplicity k . Suppose that $r > 2$ and $\mu \notin \{-1, 0\}$. We show that $k/n \leq (r-1)/(r+1)$ with equality if and only if $\mu = 1$ and G is the Petersen graph. (For any $r > 2$ there exists a connected r -regular graph with an eigenvalue $\mu \notin \{-1, 0\}$ for which $k/n > (r-2)/(r+2)$.)