Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 16, pp. 60-67, January 2007

ELA
http://math.technion.ac.il/iic/ela

ON THE NULLITY OF GRAPHS*

BO CHENG† AND BOLIAN LIU‡

Abstract. The nullity of a graph G, denoted by $\eta(G)$, is the multiplicity of the eigenvalue zero in its spectrum. It is known that $\eta(G) \leq n-2$ if G is a simple graph on n vertices and G is not isomorphic to nK_1. In this paper, we characterize the extremal graphs attaining the upper bound $n-2$ and the second upper bound $n-3$. The maximum nullity of simple graphs with n vertices and e edges, $M(n,e)$, is also discussed. We obtain an upper bound of $M(n,e)$, and characterize n and e for which the upper bound is achieved.

Key words. Graph eigenvalue, Nullity, Clique, Girth, Diameter.

AMS subject classifications. 05C50.

---

*Received by the editors 21 September 2006. Accepted for publication 21 January 2007. Handling Editor: Richard A. Brualdi.

†Department of Mathematics and Statistics, School of Informatics, Guangdong University of Foreign Studies, Guangzhou, P. R. China (bob.cheng@tom.com).

‡Corresponding author. Department of Mathematics, South China Normal University, Guangzhou, P. R. China (liubl@scnu.edu.cn). Supported by NSF of China (No.10331020).