Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 10, pp. 163-178, July 2003

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

BOUNDS FOR GRAPH EXPANSIONS VIA ELASTICITY*

M. NEUMANN† AND N. ORMES‡

Abstract. In two recent papers, one by Friedland and Schneider, the other by Förster and Nagy, the authors used polynomial matrices to study the effect of graph expansions on the spectral radius of the adjacency matrix. Here it is shown that the notion of the elasticity of the entries of a nonnegative matrix coupled with the Variational Principle for Pressure from symbolic dynamics can be used to derive sharper bounds than existing estimates. This is achieved for weighted and unweighted graphs, and the case of equality is characterized. The work is within the framework of studying measured graphs where each edge is assigned a positive length as well as a weight.

Key words. Graph expansions, Nonnegative matrices, Elasticity, Matrix polynomials.

AMS subject classifications. 05C50, 15A48, 37B10, 92D25.

*Received by the editors on 21 May 2002. Accepted for publication on 28 May 2003. Handling Editor: Stephen J. Kirkland.

†Department of Mathematics, University of Connecticut, Storrs, Connecticut 06269-3009, USA (neumann@math.uconn.edu). The work of this author was supported in part by NSF Grants Nos. DMS9973247 and DMS0201333.

‡Mathematics Department, University of Denver, 2360 S. Gaylord St., Denver, Colorado 80208, USA.