

Nodal domain counts and nodal domain morphology on discrete graphs

Idan Oren

The Weizmann Institute of Science, Rehovot, Israel

December 24, 2007

Abstract

A function f , defined on the vertices of a graph G , induces Nodal Domains on the graph. Nodal domains are maximally connected subgraphs of G , on which the function f is of constant sign. The main interest in this area, is when the function f is an eigenfunction of the discrete Laplace operator ($Lf = \lambda f$). In this talk, several results regarding the nodal domain counts on discrete graphs will be presented. One such result is a global upper bound for the number of nodal domains of G , in terms of its chromatic number. Another result is a criterion of resolution of (Laplacian) isospectral graphs via their nodal counts. In addition, several recently derived results, regarding the morphology of nodal domains, will be shown.