

Also available at <http://amc-journal.eu>
ISSN 1855-3966 (printed edn.), ISSN 1855-3974 (electronic edn.)
Ars Mathematica Contemporanea Volume 6, Issue 1, Year 2013, Pages 171–185

Sharp spectral inequalities for connected bipartite graphs with maximal Q -index

Milica Anđelić, C. M. da Fonseca, Tamara Koledin, Zoran Stanić

Abstract

The Q -index of a simple graph is the largest eigenvalue of its signless Laplacian. As for the adjacency spectrum, we will show that in the set of connected bipartite graphs with fixed order and size, the bipartite graphs with maximal Q -index are the double nested graphs. We provide a sequence of (in)equalities regarding the principal eigenvector of the signless Laplacian of double nested graphs and apply these results to obtain some lower and upper bounds for their Q -index. In the end, we give some computational results in order to compare these bounds.

Keywords: Double nested graph, signless Laplacian, largest eigenvalue, spectral inequalities.

Math Sci Net: [05C50](#)

Ostre spektralne neenakosti za povezane dvodelne grafe z maksimalnim Q -indeksom

Povzetek

Q -indeks enostavnega grafa je največja lastna vrednost njegove nepredznačene Laplaceove matrike. Za spekter sosednosti pokažemo, da imajo v množici povezanih dvodelnih grafov s fiksnim redom in velikostjo maksimalni Q -indeks dvojni vgnezdeni grafi. Poiščemo zaporedje (ne)enakosti glede na glavni lastni vektor ne-predznačene Laplaceove matrike dvojnih vgnezdenih grafov in uporabimo te rezultate pri določitvi nekaterih spodnjih in zgornjih mej za njihove Q -indekse. Za primerjavo teh mej podamo tudi nekatere računske rezultate.

Ključne besede: Dvojni vgnezdeni graf, nepredznačena Laplaceova matrika, največja lastna vrednost, spektralne neenakosti.