

Cospectrality of multipartite graphs*

Alireza Abdollahi , Niloufar Zakeri

*Department of Pure Mathematics, Faculty of Mathematics and Statistics,
University of Isfahan, Isfahan 81746-73441, Iran*

Received 10 May 2020, accepted 11 June 2021, published online 14 June 2022

Abstract

Let G be a graph on n vertices and consider the adjacency spectrum of G as the ordered n -tuple whose entries are eigenvalues of G written decreasingly. Let G and H be two non-isomorphic graphs on n vertices with spectra S and T , respectively. Define the distance between the spectra of G and H as the distance of S and T to a norm N of the n -dimensional vector space over real numbers. Define the cospectrality of G as the minimum of distances between the spectrum of G and spectra of all other non-isomorphic n vertices graphs to the norm N . In this paper we investigate cospectralities of the cocktail party graph and the complete tripartite graph with parts of the same size to the Euclidean or Manhattan norms.

Keywords: Spectra of graphs, cospectrality of graphs, adjacency matrix of a graph, Euclidean norm, Manhattan norm.

Math. Subj. Class. (2020): 05C50, 05C31

*The authors are grateful to the referee for his/her helpful comments.

E-mail addresses: a.abdollahi@math.ui.ac.ir (Alireza Abdollahi), zakeri@sci.ui.ac.ir (Niloufar Zakeri)

Kospektralnost večdelnih grafov*

Alireza Abdollahi , Niloufar Zakeri

*Department of Pure Mathematics, Faculty of Mathematics and Statistics,
University of Isfahan, Isfahan 81746-73441, Iran*

Prejeto 10. maja 2020, sprejeto 11. junija 2021, objavljeno na spletu 14. junija 2022

Povzetek

Naj bo G graf na n vozliščih; obravnavajmo spekter sosednosti grafa G kot urejeno n -terko, katere elementi so lastne vrednosti grafa G , zapisane v padajočem vrstnem redu. Naj bosta G in H dva neizomorfnata grafa na n vozliščih s spektroma S oz. T . Definirajmo razdaljo med spektroma grafov G in H kot razdaljo spektrov S in T glede na normo N n -dimenzionalnega vektorskega prostora nad obsegom realnih števil. Definirajmo kospektralnost grafa G kot najmanjšo vrednost razdalj med spektrom grafa G in spektri vseh drugih temu grafu neizomorfnih n vozliščnih grafov glede na normo N . V tem članku raziskujemo kospektralnost cp-grafa ter polnega tridelnega grafa z deli iste velikosti glede na evklidsko in Manhattansko normo.

Ključne besede: Spektri grafov, kospektralnost grafov, matrika sosednosti grafa, evklidska norma, Manhattanska norma.

Math. Subj. Class. (2020): 05C50, 05C31

* Avtorja sta hvaležna recenzentu za njegove/njene koristne pripombe.

E-poštna naslova: a.abdollahi@math.ui.ac.ir (Alireza Abdollahi), zakeri@sci.ui.ac.ir (Niloufar Zakeri)