

Notes on exceptional signed graphs

Zoran Stanić * 

*Faculty of Mathematics, University of Belgrade,
Studentski trg 16, 11 000 Belgrade, Serbia*

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Abstract

A connected signed graph is called exceptional if it has a representation in the root system E_8 , but has not in any D_k . In this study we obtain some properties of these signed graphs, mostly expressed in terms of those that are maximal with a fixed number of eigenvalues distinct from -2 . As an application, we characterize exceptional signed graphs with exactly 2 eigenvalues. In some particular cases, we prove the (non-)existence of such signed graphs.

Keywords: Adjacency matrix, least eigenvalue, root system, signed line graph, exceptional signed graph, signed graph decomposition.

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E-mail address: zstanic@math.rs (Zoran Stanić)

O izjemnih označenih grafih

Zoran Stanić * 

*Faculty of Mathematics, University of Belgrade,
Studentski trg 16, 11 000 Belgrade, Serbia*

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Povzetek

Povezan označeni graf se imenuje izjemen, če ima predstavitev v korenskem sistemu E_g , nima pa je v nobenem D_k . S to raziskavo najdemo nekaj lastnosti teh označenih grafov, večinoma se nanašajo na tiste grafe, ki so v določenem smislu maksimalni, pri čemer imajo fiksno število lastnih vrednosti, različnih od -2 . Kot primer uporabe tega rezultata karakteriziramo izjemne označene grafe z natanko dvema lastnima vrednostima. V nekaterih posebnih primerih dokažemo (ne-)obstoje takšnih označenih grafov.

Ključne besede: Matrika sosednosti, najmanjša lastna vrednost, korenski sistem, označeni linijski graf, izjemni označeni graf, razgradnja označenega grafa.

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E-poštni naslov: zstanic@math.rs (Zoran Stanić)