

On sign-symmetric signed graphs*

Ebrahim Ghorbani

*Department of Mathematics, K. N. Toosi University of Technology,
P.O. Box 16765-3381, Tehran, Iran*

Willem H. Haemers 

*Department of Econometrics and Operations Research, Tilburg University,
Tilburg, The Netherlands*

Hamid Reza Maimani , Leila Parsaei Majd †

*Mathematics Section, Department of Basic Sciences, Shahid Rajaei Teacher Training
University, P.O. Box 16785-163, Tehran, Iran*

Received 24 October 2019, accepted 27 March 2020, published online 10 November 2020

Abstract

A signed graph is said to be sign-symmetric if it is switching isomorphic to its negation. Bipartite signed graphs are trivially sign-symmetric. We give new constructions of non-bipartite sign-symmetric signed graphs. Sign-symmetric signed graphs have a symmetric spectrum but not the other way around. We present constructions of signed graphs with symmetric spectra which are not sign-symmetric. This, in particular answers a problem posed by Belardo, Cioabă, Koolen, and Wang in 2018.

Keywords: Signed graph, spectrum.

Math. Subj. Class.: 05C22, 05C50

*The authors would like to thank the anonymous referees for their helpful comments and suggestions.

†Corresponding author.

E-mail addresses: ghorbani@kntu.ac.ir (Ebrahim Ghorbani), haemers@uvt.nl (Willem H. Haemers), maimani@ipm.ir (Hamid Reza Maimani), leila.parsaei84@yahoo.com (Leila Parsaei Majd)

Predznakovno simetrični predznačeni grafi*

Ebrahim Ghorbani

*Department of Mathematics, K. N. Toosi University of Technology,
P.O. Box 16765-3381, Tehran, Iran*

Willem H. Haemers 

*Department of Econometrics and Operations Research, Tilburg University,
Tilburg, The Netherlands*

Hamid Reza Maimani, Leila Parsaei Majd[†]

*Mathematics Section, Department of Basic Sciences, Shahid Rajaei Teacher Training
University, P.O. Box 16785-163, Tehran, Iran*

Prejeto 24. oktobra 2019, sprejeto 27. marca 2020, objavljeno na spletu 10. novembra 2020

Povzetek

Predznačeni graf se imenuje predznakovno simetričen, če je preklopno izomorfen svoji negaciji. Dvodelni predznačeni grafi so trivialno predznakovno simetrični. Predstavimo nove konstrukcije nedvodelnih predznakovno simetričnih predznačenih grafov. Predznakovno simetrični predznačeni grafi imajo simetričen spekter, obratno pa ne velja. Predstavimo konstrukcije predznačenih grafov s simetričnim spektrom, ki niso predznakovno simetrični. To reši tudi problem, ki so ga zastavili Belardo, Cioabă, Koolen in Wang leta 2018.

Ključne besede: Predznačeni graf, spekter.

Math. Subj. Class.: 05C22, 05C50

* Avtorji bi se radi zahvalili neznanim recenzentom za njihove koristne pripombe in predloge.

[†] Kontaktni avtor.

E-poštni naslovi: ghorbani@kntu.ac.ir (Ebrahim Ghorbani), haemers@uvt.nl (Willem H. Haemers), maimani@ipm.ir (Hamid Reza Maimani), leila.parsaei84@yahoo.com (Leila Parsaei Majd)