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On Graphs with the Smallest Eigenvalue at Least – $1 - \sqrt{2}$, part I

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Abstract

There are many results on graphs with the smallest eigenvalue at least $\sqrt{2}$. As a next step, A. J. Hoffman proposed to study graphs with the smallest eigenvalue at least $1 - \sqrt{2}$. In order to deal with such graphs, R. Woo and A. Neumaier introduced the concept of a Hoffman graph, and defined a new generalization of line graphs which depends on a family of Hoffman graphs. They proved a theorem analogous to Hoffman's, using a particular family consisting of four isomorphism classes.

In this paper, we deal with a generalization based on a family H smaller than the one which they dealt with, yet including generalized line graphs in the sense of Hoffman. The main result is that the cover of an H -line graph with at least 8 vertices is unique.

Keywords: Generalized line graph, Spectrum.

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On grafih z najmanjšo lastno vrednostjo najmanj $1 - \sqrt{2}$, I. del

Povzetek

Obstaja veliko rezultatov o grafih z najmanjšo lastno vrednostjo najmanj $\sqrt{2}$. Kot naslednji korak je A. J. Hoffman predlagal raziskovanje grafov z najmanjšo lastno vrednostjo najmanj $1 - \sqrt{2}$. Za namene obravnave takšnih grafov sta R. Woo and A. Neumaier vpeljala koncept Hoffmanovega grafa, in definirala novo posplošitev linijskih grafov, ki je odvisna od družine Hoffmannovih grafov. Dokazala sta izrek, analogen Hoffmanovemu, pri čemer sta si pomagala s posebno družino, sestoječo iz štirih izomorfnostnih razredov.

V tem članku se ukvarjamo s posplošitvijo, osnovano na družini H , manjši kot je tista, ki sta jo obravnavala onadva, ki pa vendarle vsebuje posplošene linijske grafe Hoffmanovega tipa. Glavni rezultat je, da je krov H -linijskega grafa z najmanj 8 vozlišči en sam.

Ključne besede: Posplošeni linijski graf, spekter.