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On the domination number and the total domination number of Fibonacci cubes

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Abstract

Fibonacci cubes are special subgraphs of the hypercube graphs. Their domination numbers and total domination numbers are obtained for some small dimensions by integer linear programming. For larger dimensions upper and lower bounds on these numbers are given. In this paper, we present the up-down degree polynomials for Fibonacci cubes containing the degree information of all vertices in more detail. Using these polynomials we define optimization problems whose solutions give better lower bounds on the domination numbers and total domination numbers of Fibonacci cubes. Furthermore, we present better upper bounds on these numbers.

Keywords: Fibonacci cubes, domination number, total domination number, integer linear programming.

Math. Subj. Class.: 05C69, 68R10, 11B39

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O dominantnem številu in totalno dominantnem številu Fibonaccijevih kock

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Povzetek

Fibonaccijeve kocke so posebni podgrafi hiperkock. Njihova dominantna števila in totalno dominantna števila se dobijo za nekaj majhnih dimenzij s pomočjo celoštevilskega linearnega programiranja. Za večje dimenzije so dane zgornje in spodnje meje za ta števila. V tem članku predstavimo polinome zgornjih in spodnjih stopenj za Fibonaccijeve kocke, ki vsebujejo natančnejšo informacijo o stopnjah vseh točk. Z uporabo teh polinomov definiramo optimizacijske probleme, katerih rešitev daje boljše spodnje meje za dominantna števila in totalno dominantna števila Fibonaccijevih kock. Predstavimo tudi boljše zgornje meje za ta števila.

Ključne besede: Fibonaccijeve kocke, dominantno število, totalno dominantno število, celoštevilsko linearno programiranje.

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