

Also available at <http://amc-journal.eu>
ISSN 1855-3966 (printed edn.), ISSN 1855-3974 (electronic edn.)
Ars Mathematica Contemporanea Volume 6, Issue 2, Year 2013, Pages 323–350

Relations between graphs

Jan Hubička, Jürgen Jost, Yangjing Long, Peter F. Stadler,
Ling Yang

Abstract

Given two graphs $G = (V_G, E_G)$ and $H = (V_H, E_H)$, we ask under which conditions there is a relation $R \subseteq V_G \times V_H$ that generates the edges of H given the structure of the graph G . This construction can be seen as a form of multihomomorphism. It generalizes surjective homomorphisms of graphs and naturally leads to notions of R -retractions, R -cores, and R -cocores of graphs. Both R -cores and R -cocores of graphs are unique up to isomorphism and can be computed in polynomial time.

Keywords: Generalized surjective graph homomorphism, R -reduced graph, R -retraction, binary relation, multihomomorphism, R -core, cocore.

Math. Subj. Class.: 05C60, 05C76

Math Sci Net: [05C60 \(05C76\)](#)

Relacije med grafi

Povzetek

V članku raziskujemo, pod kakšnimi pogoji za dana grafa $G = (V_G, E_G)$ in $H = (V_H, E_H)$ obstaja relacija $R \subseteq V_G \times V_H$, ki pri dani strukturi grafa G generira povezave grafa H . Takšno konstrukcijo lahko razumemo kot primer multihomomorfizma. Gre za poplošitev surjektivnih homomorfizmov grafov, ki naravno privede do pojmov R -retraktov, R -jeder in R -kojeder grafov. Tako R -jedra kot R -kojedra grafov so enolično določena do izomorfizma natanko in jih lahko izračunamo v polinomskega času.

Ključne besede: Posplošeni surjektivni homomorfizem grafov, R -reduciran graf, R -retrakt, dvojiška relacija, multihomomorfizem, R -jedro, kojedro.