Povzetek

Pričujoče diplomsko delo obravnava **visoko ločno tranzitivne digrafe**, to je tiste digrafe, katerih grupa avtomorfizmov deluje tranzitivno na pripadajočih množicah s-lokov za vsak $s \geq 0$. Pretežni del vsebine tega dela izhaja iz obsežnega raziskovalnega članka "Infinite highly arc transitive digraphs and universal covering digraphs", *Combinatorica*, **13** (1993), 377-396 (P. J. Cameron, C. E. Praeger in N. C. Wormald), predvsem pa se osredotoči na nekatere tam postavljene odprte probleme; tako tiste, ki so bili kasneje rešeni, kot tiste, ki ostajajo še naprej odprti. Prav pri enem od slednjih je to diplomsko delo tudi skromen, a izviren prispevek k obravnavani tematiki, saj pokaže, da ostaja eden od omenjenih problemov kljub nasprotni trditvi v članku "Descendants in highly arc transitive digraphs", *Discrete Math.*, **247** (2002), 147-157 (R. G. Möller) še naprej odprt.

Za povezan, 1-tranzitiven, bipartiten digraf Δ se konstruira visoko ločno tranzitiven digraf $DL(\Delta)$ in pokaže, da je digraf $DL(\Delta)$ krovni digraf vsakega digrafa iz določenega razreda $\mathcal{D}(\Delta)$ povezanih digrafov. Če je digraf Δ tudi lokalno končen, je digraf $DL(\Delta)$ celo univerzalni krovni digraf za razred $\mathcal{D}(\Delta)$.

Digraf D ima **lastnost** Z, če obstaja kak epimorfizem digrafov iz digrafa D v digraf Z, to je digraf z množico točk $\mathbb{Z}$ in množico lokov $\{(i, i + 1) \mid i \in \mathbb{Z}\}$. Pokaže se, da digraf $DL(\Delta)$ ima lastnost Z. Odgovori se na nekatera vprašanja v zvezi z visoko ločno tranzitivnimi digrafi in lastnostjo Z, ki so bila postavljena v zgoraj omenjenem članku. Med drugim se konstruira visoko ločno tranzitivne digrafe iz razreda $\mathcal{D}(\Delta)$, ki nimajo lastnosti Z. Pokaže se, da ima vsak neskončen, povezan, visoko ločno tranzitiven digraf D s končno izhodno stopnjo, katerega izhodna razpršenost je enaka 1, lastnost Z. Če ima omenjeni digraf D tudi vhodno razpršenost enako 1, ima vsak homomorfizem digrafov iz digrafa D v digraf Z končna vlakna.

Abstract

The present BSc thesis is concerned with **highly arc transitive digraphs**, that is, digraphs whose automorphism groups act transitively on the corresponding sets of s-arcs for all $s \geq 0$. The main part of this thesis covers a comprehensive research article "Infinite highly arc transitive digraphs and universal covering digraphs", *Combinatorica*, **13** (1993), 377-396 (P. J. Cameron, C. E. Praeger and N. C. Wormald). In particular, it focuses on some open problems stated there; the ones which have later been solved and also the ones that remain open. The above thesis is also a small but original contribution to this area of research as it shows that one of the above mentioned problems stays open in spite of a contrary statement made in the article "Descendants in highly arc transitive digraphs", *Discrete Math.*, **247** (2002), 147-157" (R. G. Möller).

For a connected, 1-arc transitive, bipartite digraph Δ, a highly arc transitive digraph $DL(\Delta)$ is constructed and is shown to be a covering digraph for every digraph in a certain class $\mathcal{D}(\Delta)$ of connected digraphs. Moreover, if Δ is locally finite, then $DL(\Delta)$ is a universal covering digraph for $\mathcal{D}(\Delta)$.

A digraph D is said to have **property Z**, if there exists a digraph epimorphism from D onto the digraph Z with vertex set $\mathbb{Z}$ (the set of all integers) and the set of arcs $\{(i, i+1) \mid i \in \mathbb{Z}\}$. It is shown that $DL(\Delta)$ has property Z. Furthermore, some of the questions concerning highly arc transitive digraphs and property Z, stated in the above mentioned article of Cameron, Praeger and Wormald, are answered. Also, highly arc transitive digraphs from class $\mathcal{D}(\Delta)$ without property Z are constructed. It is shown that an infinite, connected, highly arc transitive digraph D with finite out-valency and out-spread 1 has property Z. If the in-spread of D also equals 1 then each digraph homomorphism from D to Z has finite fibres.

Literatura

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