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Generalized Cayley maps and their Petrie duals*

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Abstract

Cayley maps are embeddings of Cayley graphs in orientable surfaces which possess a group of orientation preserving automorphisms acting regularly on the vertices. We generalize the concept of a Cayley map by considering embeddings of Cayley graphs in both orientable and non-orientable surfaces and by requiring a group of automorphisms acting regularly on vertices that does not have to consist entirely of orientation preserving automorphisms. This leads to new families of maps in both the orientable and non-orientable cases. Since the Petrie dual operator preserves the property of being a generalized Cayley map, throughout the paper we consider the action of this operator on our maps.

Keywords: Cayley map, regular embedding, automorphism group of a map.

Math. Subj. Class. (2020): 05C10, 05C25, 05E18

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Posplošeni Cayleyjevi zemljevidi in njihovi Petriejevi duali*

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Povzetek

Cayleyjevi zemljevidi so vložitve Cayleyjevih grafov na orientabilne ploskve z grupo avtomorfizmov, ki ohranjajo orientacijo in delujejo regularno na točkah grafa. Posplošimo koncept Cayleyjevega zemljevida z obravnavanjem vložitev Cayleyjevih grafov tako na orientabilne kot na neorientabilne ploskve in z zahtevo, da grupa avtomorfizmov deluje regularno na točkah, pri čemer ni nujno, da sestoji izključno iz avtomorfizmov, ki ohranjajo orientacijo. To vodi k novim družinam zemljevidov tako v orientabilnem kot v neorientabilnem primeru. Ker Petriejev dualni operator ohranja lastnost pripadnosti družini posplošenih Cayleyjevih zemljevidov, v članku obravnavamo delovanje tega operatorja na naših zemljevidih.

Ključne besede: Cayleyjev zemljevid, regularna vložitev, grupa avtomorfizmov zemljevida.

Math. Subj. Class. (2020): 05C10, 05C25, 05E18

*Želimo se zahvaliti našim recenzentom za njihovo večkratno skrbno branje našega članka in njihove koristne in strokovne predloge, ki so pomagali znatno izboljšati naš članek in ga naredili bolj osredotočenega.

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