

On local operations that preserve symmetries and on preserving polyhedrality of maps

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Abstract

We prove that local operations that preserve all symmetries, as e.g. dual, truncation, medial, or join, as well as local operations that are only guaranteed to preserve all orientation-preserving symmetries, as e.g. gyro or snub, preserve the polyhedrality of simple maps. This generalizes a result by Mohar proving this for the operation dual. We give the proof based on an abstract characterization of these operations, prove that the operations are well defined, and also demonstrate the close connection between these operations and Delaney-Dress symbols.

Keywords: Embedded graph, map, polyhedral embedding, operation, symmetry, tiling.

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Lokalne operacije, ki ohranjajo simetrije, in ohranjanje poliedrskosti zemljevidov

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Povzetek

Dokažemo, da lokalne operacije, ki ohranjajo vse simetrije, kot so npr. dual, obrezovanje, medial in spoj, kot tudi lokalne operacije, za katere je zagotovljeno le, da ohranjajo vse simetrije, ki ohranjajo orientacijo, kot sta npr. gyro ali snub, ohranjajo poliedrskost enostavnih zemljevidov. To je posplošitev Moharjevega rezultata; on je to dokazal za operacijo dual. Naš dokaz temelji na abstraktni karakterizaciji teh operacij; dokažemo, da so te operacije dobro definirane, prikažemo pa tudi tesno povezavo med njimi in simboli Delaneyja in Dressa.

Ključne besede: Vloženi graf, zemljevid, poliedrska vložitev, operacija, simetrija, tlakovanje.

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