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## Matchings in $m$ -generalized fullerene graphs

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**Abstract:** A connected planar graph is called  $m$ -generalized fullerene if two of its faces are  $m$ -gons and all other faces are pentagons and hexagons. In this paper we first determine some structural properties of  $m$ -generalized fullerenes and then use them to obtain new results on the enumerative aspects of perfect matchings in such graphs. We provide both upper and lower bounds on the number of perfect matchings in  $m$ -generalized fullerene graphs and state exact results in some special cases.

**Keywords:** Perfect matching, Pfaffian graph, fullerene graph, Hadamard-Fischer inequality.

Math. Subj. Class.: 05C30, 05C70, 15A15

## Prirejanja v $m$ -posplošenih fullerenskih grafih

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**Povzetek:** Povezan ravninski graf se imenuje  $m$ -posplošeni fuleren, če sta dve njegovi lici  $m$ -kotnika, vsa druga lica pa so petkotniki in šestkotniki. V tem članku najprej določimo nekaj strukturnih lastnosti  $m$ -posplošenih fulerenov, nato pa jih uporabimo za to, da dobimo nove rezultate v zvezi s preštevanjem popolnih prirejanj v takšnih grafih. Najdemo zgornjo in spodnjo mejo števila popolnih prirejanj v  $m$ -posplošenih fullerenskih grafih in navedemo natančne rezultate v nekaterih posebnih primerih.

**Ključne besede:** Popolno prirejanje, Pfaffov graph, fullerenski graf, Hadamard-Fischerjeva neenakost.

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