



# Trivalent dihedrants and bi-dihedrants\*

Mi-Mi Zhang 

*School of Mathematical Sciences, Hebei Normal University, Shijiazhuang, 050024, China*

Jin-Xin Zhou <sup>†</sup> 

*Department of Mathematics, Beijing Jiaotong University, Beijing, 100044, China*

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## Abstract

A Cayley (resp. bi-Cayley) graph on a dihedral group is called a *dihedrant* (resp. *bi-dihedrant*). In 2000, a classification of trivalent arc-transitive dihedrants was given by Marušič and Pisanski, and several years later, trivalent non-arc-transitive dihedrants of order  $4p$  or  $8p$  ( $p$  a prime) were classified by Feng et al. As a generalization of these results, our first result presents a classification of trivalent non-arc-transitive dihedrants. Using this, a complete classification of trivalent vertex-transitive non-Cayley bi-dihedrants is given, thus completing the study of trivalent bi-dihedrants initiated in our previous paper [Discrete Math. 340 (2017) 1757–1772]. As a by-product, we generalize a theorem in [The Electronic Journal of Combinatorics 19 (2012) #P53].

*Keywords:* Cayley graph, non-Cayley, bi-Cayley, dihedral group, dihedrant, bi-dihedrant.

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<sup>†</sup>Corresponding author.

*E-mail addresses:* mmzhang@hebtu.edu.cn (Mi-Mi Zhang), jxzhou@bjtu.edu.cn (Jin-Xin Zhou)

# Trivalentni diedrski in bi-diedrski grafi\*

Mi-Mi Zhang 

*School of Mathematical Sciences, Hebei Normal University, Shijiazhuang, 050024, China*

Jin-Xin Zhou <sup>†</sup> 

*Department of Mathematics, Beijing Jiaotong University, Beijing, 100044, China*

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## Povzetek

Cayleyjev (oz. bi-Cayleyjev) graf diedrske grupe se imenuje *diedrski* (oz. *bi-diedrski graf*). Leta 2000 sta Marušič in Pisanski predstavila klasifikacijo trivalentnih ločno-tranzitivnih diedrskih grafov, nekaj let kasneje pa so Feng in dr. klasificirali tiste trivalentne diedrske grafe reda  $4p$  ali  $8p$  (kjer je  $p$  praštevilo), ki niso ločno tranzitivni. V tem članku posplošiva te rezultate; najprej predstaviva klasifikacijo tistih trivalentnih diedrskih grafov, ki niso ločno tranzitivni. Na tej osnovi podava popolno klasifikacijo trivalentnih točkovno tranzitivnih ne-Cayleyjevih bi-diedrskih grafov, s čimer zaključiva raziskavo trivalentnih bi-diedrskih grafov, ki sva jo začela v najinem prejšnjem članku [Discrete Math. 340 (2017) 1757–1772]. Poleg tega posplošiva še izrek iz [The Electronic Journal of Combinatorics 19 (2012) #P53].

*Ključne besede:* Cayleyjev graf, ne-Cayleyjev, bi-Cayleyjev, diedrska grupa, diedrski graf, bi-diedrski graf.

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<sup>†</sup>Kontaktni avtor.

*E-poštna naslova:* mmzhang@hebtu.edu.cn (Mi-Mi Zhang), jxzhou@bjtu.edu.cn (Jin-Xin Zhou)