



A Kepler–Poinsoot-type polyhedron of the genus 7 Hurwitz surface

Jürgen Bokowski* 

*Department of Mathematics, Technische Universität Darmstadt,
Schlossgartenstrasse 7, D-64289 Darmstadt, Germany*

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Abstract

In 2017 a first polyhedral embedding of the genus 7 Hurwitz surface of type $\{3, 7\}_{18}$ was found by M. Cuntz and the author. For all previously determined polyhedral embeddings of regular maps, there exist those with non-trivial geometric symmetries as well. The orientation-preserving combinatorial automorphism group of this regular map of Hurwitz is the projective special linear group $\mathrm{PSL}(2, 8)$. For its subgroups, their possible corresponding geometric polyhedral embeddings have been investigated by G. Gévay and the author in this volume. There is an additional symmetry of order 2 that reverses the orientation. For this symmetry with eight fixed points, this paper provides a Kepler–Poinsoot-type polyhedron which realizes this symmetry together with two additional symmetries of order 2. This polyhedron might serve as a starting point for proving that a geometric symmetry of order 2 for an embedding cannot exist.

Keywords: Hurwitz surface, regular map, Kepler–Poinsoot-polyhedron.

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E-mail address: juergen@bokowski.de (Jürgen Bokowski)



Polieder Kepler–Poinsovega tipa Hurwitzeve ploskve rodu 7

Jürgen Bokowski* 

*Department of Mathematics, Technische Universität Darmstadt,
Schlossgartenstrasse 7, D-64289 Darmstadt, Germany*

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Povzetek

Leta 2017 sta M. Cuntz in avtor tega članka našla prvo poliedrsko vložitev Hurwitzeve ploskve, katere tip je $\{3, 7\}_{18}$, rod pa 7. Za vse pravilne zemljevide, katerih poliedrske vložitve so preučili doslej, se je izkazalo, da za njih obstajajo tudi takšne, ki imajo netrivialne geometrijske simetrije. Grupa tistih kombinatoričnih avtomorfizmov tega pravilnega Hurwitzevega zemljevida, ki ohranjajo orientacijo, je projektivna posebna linearna grupa $\mathrm{PSL}(2, 8)$. Za njene podgrupe sta G. Gévay in avtor tega članka v tem zvezku raziskala njihove možne ustrezne geometrijske poliedrske vložitve. Obstaja še dodatna simetrija reda 2, ki pa orientacijo obrne. Za to simetrijo z osmimi fiksnimi točkami je v tem članku predstavljen polieder Kepler–Poinsovega tipa, ki poleg realizacije te simetrije premore še dve dodatni simetriji reda 2. Ta polieder bi lahko služil kot izhodišče za dokaz, da ni vložitve z geometrijsko simetrijo reda 2.

Ključne besede: Hurwitzeva ploskev, pravilen zemljevid, Kepler–Poinsov polieder.

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E-poštni naslov: juergen@bokowski.de (Jürgen Bokowski)