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Partitioning transitive tournaments into isomorphic digraphs. (English) [Zbl 07362783]
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Summary: In an earlier paper [A. Sali and G. Simonyi, Eur. J. Comb. 20, No. 1, 93–99 (1999; Zbl 0917.05075)] the first two authors have shown that self-complementary graphs can always be oriented in such a way that the union of the oriented version and its isomorphically oriented complement gives a transitive tournament. We investigate the possibilities of generalizing this theorem to decompositions of the complete graph into three or more isomorphic graphs. We find that a complete characterization of when an orientation with similar properties is possible seems elusive. Nevertheless, we give sufficient conditions that generalize the earlier theorem and also imply that decompositions of odd vertex complete graphs to Hamiltonian cycles admit such an orientation. These conditions are further generalized and some necessary conditions are given as well.

MSC:
05C20 Directed graphs (digraphs), tournaments
05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)
05C45 Eulerian and Hamiltonian graphs

Keywords:
graph orientation; decomposition to isomorphic graphs; transitive tournament

Full Text: DOI

References:
[14] Nešetřil, J.; Rosenfeld, M., Schur, I. Shannon and Ramsey C.E. Numbers, A Short Story, Combinatorics, Graph Theory,


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