Du, Shao-Fei; Kwak, Jin Ho
Nonorientable regular embeddings of graphs of order $p^2$. (English) Zbl 1222.05189

Summary: A map is called regular if its automorphism group acts regularly on the set of all flags (incident vertex-edge-face triples). An orientable map is called orientably regular if the group of all orientation-preserving automorphisms is regular on the set of all arcs (incident vertex-edge pairs). If an orientably regular map admits also orientation-reversing automorphisms, then it is regular, and is called reflexible.

A regular embedding and orientably regular embedding of a graph $G$ are, respectively, 2-cell embeddings of $G$ as a regular map and orientably regular map on some closed surface. In [S. F. Du, J. H. Kwak, and R. Nedela, “A classification of regular embeddings of graphs of order a product of two primes,” J. Algebr. Comb. 19, No.2, 123–141 (2004; Zbl 1042.05027), the orientably regular embeddings of graphs of order $pq$ for two primes $p$ and $q$ (may be equal to $q$) have been classified, where all the reflexible maps can be easily read from the classification theorem. S. F. Du and F. R. Wang (“Nonorientable regular embeddings of graphs of order a product of two distinct primes,” (to appear) classified the nonorientable regular embeddings of these graphs for $p \neq q$. In this paper, we shall classify the nonorientable regular embeddings of graphs of order $p^2$ where $p$ is a prime so that a complete classification of regular embeddings of graphs of order $pq$ for two primes $p$ and $q$ is obtained. All graphs in this paper are connected and simple.

MSC:
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)

Keywords:
vertex-transitive graph; regular map; permutation group

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References:

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