Deryagina, M.
On the enumeration of hypermaps which are self-equivalent with respect to reversing the colors of vertices. (English) Zbl 1377.05087

Summary: A map \((S, G)\) is a closed Riemann surface \(S\) with embedded graph \(G\) such that \(S \setminus G\) is the disjoint union of connected components, called faces, each of which is homeomorphic to an open disk.

W. T. Tutte [Can. J. Math. 15, 249–271 (1963; Zbl 0115.17305)] began a systematic study of maps in the 1960s and contemporary authors are actively developing it. In the present paper, after recalling the concept of a circular map introduced by M. Deryagina and A. D. Mednykh [Sib. Math. J. 54, No. 4, 624-639 (2013); translation from Sib. Mat. Zh. 54, No. 4, 788-806 (2013; Zbl 1277.30031)], a relationship between bipartite maps and circular maps is demonstrated via the concept of the duality of maps. In this way an enumeration formula for the number of bipartite maps with a given number of edges is obtained.

A hypermap is a map whose vertices are colored black and white in such a way that every edge connects vertices of different colors. The hypermaps are also known as dessins d’enfants (or Grothendieck’s dessins).

A hypermap is self-equivalent with respect to reversing the colors of vertices if it is equivalent to the hypermap obtained by reversing the colors of its vertices.

The main result of the present paper is an enumeration formula for the number of unrooted hypermaps, regardless of genus, which have \(n\) edges and are self-equivalent with respect to reversing the colors of vertices.

MSC:

- 05C30 Enumeration in graph theory
- 05A15 Exact enumeration problems, generating functions
- 05C15 Coloring of graphs and hypergraphs
- 30F99 Riemann surfaces

Keywords:

- enumeration formula; number of unrooted hypermaps

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References:


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