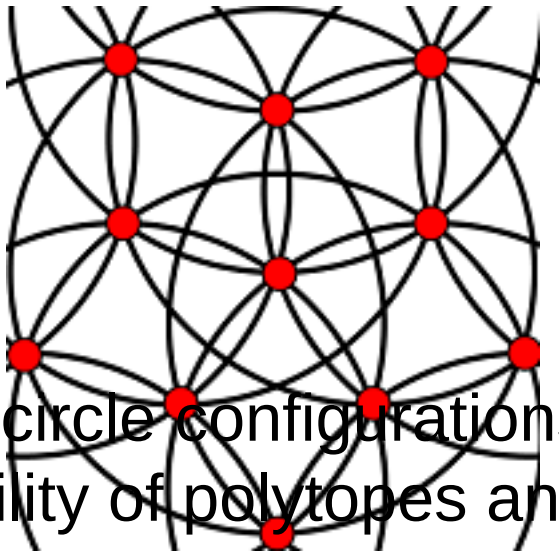
CSASC 2013



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Point-circle configurations and inscribability of polytopes and graphs

Content :

We call a graph G inscribable of order m (in brief, m-inscribable) if its vertices can be located on the sphere S^2 in such a way that for each vertex v, the vertices at distance m from v lie in a common plane ($m=1,2,...$). If, in particular, G is planar and 3-connected, then, on account of Steinitz' characterization theorem, we can define the same property for a 3-polytope P whose 1-skeleton is isomorphic to G. If the planes in the definition above are all distinct, then G (respectively P) admits a point-circle configuration of type (n_k), where n is the number of vertices of G and k is the number of mth neighbours of v. Examples are the Platonic and Archimedean solids; they are all 1-inscribable, and some of them are 2-inscribable. In this talk we present, besides sporadic examples and finite classes, some infinite series of m-inscribable graphs and polyhedra. We also raise some open problems.

The results presented here were obtained partly in joint work with Tomaz Pisanski.

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