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Tilings by regular polygons. III: Dodecagon-dense tilings. (English) Zbl 1324.52014

Summary: In [Tilings and patterns. York: W. H. Freeman and Company (1987; Zbl 0601.05001)] B. Grünbaum and G. C. Shephard claim that there are only four $k$-uniform tilings by regular polygons (for some $k$) that have a dodecagon incident at every vertex. In fact, there are many others. We show that the tilings that satisfy this requirement are either the uniform 4.6.12 tiling, or else fall into one of two infinite classes of such tilings. One of these infinite classes can be fully characterized, while the other can be shown to be equivalent to the class of all tilings by squares and equilateral triangles; i.e., a largely unconstrained infinite class. This characterization is, however, sufficiently powerful to determine all such $k$-uniform tilings for $k \leq 14$.


MSC:

52C22 Tilings in $n$ dimensions (aspects of discrete geometry)
52C20 Tilings in 2 dimensions (aspects of discrete geometry)

Keywords:
tilings; patterns; periodic designs; regular polygons; dodecagons