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Three-periodic nets and tilings: regular and related infinite polyhedra. (English)

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Summary: The six infinite regular (flag-transitive) polyhedra with finite faces of Grünbaum and Dress are described as tilings of the P and D periodic minimal surfaces. The three polyhedra formed by analogous tiling of the G surface are also described. The nets of these polyhedra are identified. It is shown how these polyhedra, and the nets they carry, could be found by mining the EPINET database of structures. The nets of regular three-periodic polyhedra with infinite helical or zigzag faces are also identified.

MSC:

52C22 Tilings in n dimensions (aspects of discrete geometry)
51M20 Polyhedra and polytopes; regular figures, division of spaces
82D25 Statistical mechanics of crystals

Keywords:

infinite polyhedra; nets; tilings

Software:

EPINET

Full Text: DOI