



This monograph identifies polytopes that are “combinatorially ℓ_1 -embeddable”, within interesting lists of polytopal graphs, i.e. such that corresponding polytopes are either prominent mathematically (regular partitions, root lattices, uniform polytopes and so on), or applicable in chemistry (fullerenes, polycycles, etc.). The embeddability, if any, provides applications to chemical graphs and, in the first case, it gives new combinatorial perspective to “ ℓ_2 -prominent” affine polytopal objects.

The lists of polytopal graphs in the book come from broad areas of geometry, crystallography and graph theory. The book concentrates on such concise and, as much as possible, independent definitions. The scale-isometric embeddability — the main unifying question, to which those lists are subjected — is presented with the minimum of technicalities.

Scale-Isometric Polytopal Graphs in Hypercubes and Cubic Lattices

Polytopes in Hypercubes and \mathbb{Z}_n

by

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Contents: Introduction: Graphs and Their Scale-Isometric Embedding; An Example: Embedding of Fullerenes; Regular Tilings and Honeycombs; Semi-regular Polyhedra and Relatives of Prisms and Antiprisms; Truncation, Capping and Chamfering; 92 Regular-faced (not Semi-regular) Polyhedra; Semi-regular and Regular-faced n -Polytopes, $n \geq 4$; Polycycles and Other Chemically Relevant Graphs; Plano Tilings; Uniform Partitions of 3-Space and Relatives; Lattices, Bi-lattices and Tiles; Small Polyhedra; Bifaced Polyhedra; Special ℓ_1 -graphs; Some Generalization of ℓ_1 -embedding.

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