Abstract

Constructing combinatorial structures with prescribed numbers of orbits

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Given a positive integer d, for which pairs (m, n) of integers does there exist a finite regular graph of degree d whose automorphism group has exactly m orbits on the set of vertices and n orbits on the set of edges ? Similar questions may be asked for other combinatorial structures like graphs, hypergraphs, designs, linear spaces, convex polyhedra, etc... The talk will be a survey of known results and open problems related to these questions.