

# From the existence of graphical regular representations to their asymptotic enumeration

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A digraphical regular representation of a group  $R$  is a Cayley digraph  $\text{Cay}(R, S)$  having automorphism group isomorphic to  $R$ . This definition captures the idea of representing a group  $R$  as the automorphism group of a combinatorial structure: in this case a digraph. In this talk, we consider various combinatorial structures (digraphs, graphs, oriented graphs, bipartite graphs, regular maps) and, for each structure, we discuss the existence of a regular representation and, in a few cases, we also discuss their asymptotic enumeration.