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Semiregular Automorphism Groups of Graphical Structures

By $GR(k)$, $DGR(k)$, $BGR(k)$, $SGR(k)$ we denote the classes of automorphism groups of k-edge colored graphs, digraphs, hypergraphs, and supergaphs of order k. The more general problem in these areas is: to describes all these classes for each k.

I show the solution of this problem for the case of semiregular permutation groups, i.e., for every semiregular permutation group A, I show k_1, k_2, k_3, k_4 such that $A \in GR(k_1) \setminus GR(k_1 - 1)$, $A \in DGR(k_2) \setminus DGR(k_2 - 1)$, $A \in BGR(k_3) \setminus BGR(k_3 - 1)$, and $A \in SGR(k_4) \setminus SGR(k_4 - 1)$.