Classes of differential equations and their equivalence groupoids

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Abstract**:**

We formalize the notion of class of systems of differential equations within the framework of group analysis of differential equations. Point (resp. contact) transformations in certain underlying spaces, which are associated with a class of differential equations, form various algebraic objects. The basic object is the equivalence groupoid of the class, which consists of all admissible point transformations within the class. We discuss classical notions of group analysis, like the point symmetry group of a system of differential equations or the equivalence group of a class of such systems, in the context of groupoid theory. We present tools for constructing equivalence groupoids. The description of an equivalence groupoid may involve classification of admissible transformations, generalizations of equivalence group, partition into subclasses with equivalence groupoids of simpler structure, mappings between classes, etc.