

NICE CATEGORIES

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General mathematical structures, e.g. in the sense of Bourbaki, can be used as a possible motivation for introducing categories and for categorical unification of mathematics. The unification then leads to a new way of thinking, not in terms of manipulating with elements of mathematical structures, but in terms of composing morphisms between objects of an abstract category, creating a new algebra that applies to all areas of mathematics. However, many categorical concepts and arguments require additional conditions on a ground category, which, in more than sixty years of development, created a very sophisticated hierarchy of nice categories. One of lines in this hierarchy, which we shall essentially follow trying to make our presentation self-contained, can be briefly described as: finitely complete–regular–exact–semi-abelian–abelian. The conditions involved here are perfectly well understood in many classical-algebraic examples, less well in topology and topological algebra, and much less in functional analysis. At the end of the talk some recent results and open problems will be mentioned.

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