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Functorial theory of parameterized specifications in a general specification framework. (English) Zbl 0829.68086

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Summary: A general specification framework based on the notion of indexed categories is introduced in order to study the structural aspects of specifications independent of the underlying logics. Similar to institutions this concept of specification frames allows to formulate a unified structural theory of various kinds of algebraic specifications which have been studied separately in the literature before. In contrast to institutions we do not require to have satisfaction relations and conditions which allows to handle also behavioural specifications and semantics and various concepts of constraints in this framework.

In this framework we generalize the well-known theory of parametrized algebraic specifications with initial semantics from the equational case to specification frames satisfying mainly three basic axioms: The existence of pushouts, free constructions and amalgamation. Moreover, an axiomatic treatment of restriction is presented which allows to study in addition to refinement also implementations of parametrized specifications including restrictions. Finally we present an axiomatic framework for functorial semantics which opens the way to apply the theory not only to initial semantics but also to other kinds of functorial semantics, including final and specific kinds of loose semantics.

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MSC:

68Q65 Abstract data types; algebraic specification

68Q60 Specification and verification (program logics, model checking, etc.)

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Keywords:

structural aspects of specifications; algebraic specifications; functorial semantics

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