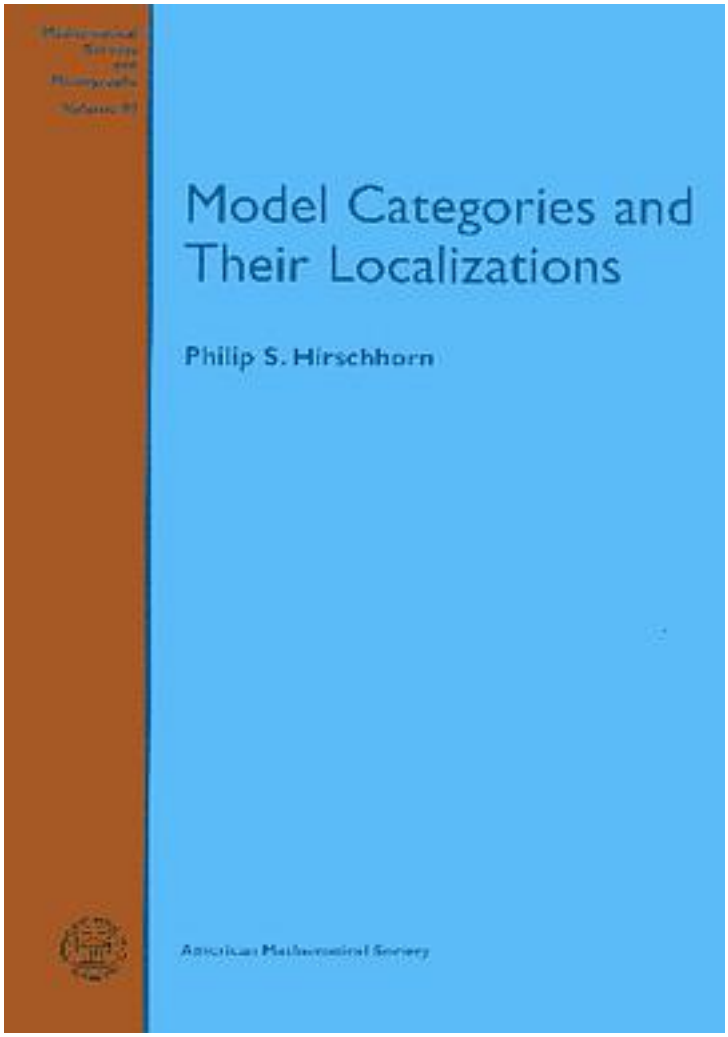
Model Categories and Their Localizations



Model Categories and Their Localizations_下载链接1_

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The aim of this book is to explain modern homotopy theory in a manner accessible to

graduate students yet structured so that experts can skip over numerous linear developments to quickly reach the topics of their interest. Homotopy theory arises from choosing a class of maps, called weak equivalences, and then passing to the homotopy category by localizing with respect to the weak equivalences, i.e., by creating a new category in which the weak equivalences are isomorphisms. Quillen defined a model category to be a category together with a class of weak equivalences and additional structure useful for describing the homotopy category in terms of the original category. This allows you to make constructions analogous to those used to study the homotopy theory of topological spaces.

A model category has a class of maps called weak equivalences plus two other classes of maps, called cofibrations and fibrations. Quillen's axioms ensure that the homotopy category exists and that the cofibrations and fibrations have extension and lifting properties similar to those of cofibration and fibration maps of topological spaces. During the past several decades the language of model categories has become standard in many areas of algebraic topology, and it is increasingly being used in other fields where homotopy theoretic ideas are becoming important, including modern algebraic K-theory and algebraic geometry.

All these subjects and more are discussed in the book, beginning with the basic definitions and giving complete arguments in order to make the motivations and proofs accessible to the novice. The book is intended for graduate students and research mathematicians working in homotopy theory and related areas.

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