Dwyer, W. G.; **Spalinski, J.**

Homotopy theories and model categories. (English) Zbl 0869.55018

James, I. M. (ed.), Handbook of algebraic topology. Amsterdam: North-Holland. 73-126 (1995).

In [Homotopical algebra, Lect. Notes Math. 43 (1967; Zbl 0168.20903)] *D. G. Quillen* has given a categorical approach to homotopy theory based on the notion of a model category. A model category is a category with three specified classes of morphisms, called fibrations, cofibrations and weak equivalences which satisfy a few axioms that are reminiscent of basic properties of homotopy theory of topological spaces. The general approach can be applied immediately to a large number of different settings, not only in topology (spaces, fibrewise spaces, G-spaces,...) but also in algebra (chain complexes, simplicial commutative rings, simplicial groups,...). In the present paper Quillen's ideas (and some ideas which go beyond, cf. the section on homotopy pushouts and homotopy pullbacks in a model category) are exhibited in a transparent way. As far as the development of the theory is concerned the paper is self-contained whereas some of the examples, in particular at the end of the paper, are more demanding.

The paper appeals and is recommended to both beginners and experts in the subject.

For the entire collection see [Zbl 0824.00017].

Reviewer: K.H.Kamps (Hagen)

MSC:

55U35 Abstract and axiomatic homotopy theory in algebraic topology
18G35 Chain complexes (category-theoretic aspects), dg categories

Keywords:

homotopy theory; model category; fibrations; cofibrations; weak equivalences