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Dendroidal Sets

Abstract: The concept of a dendroidal set is a generalization of the notion of a simplicial set, specially suited to the study of operads in the context of homotopy theory. We define a category of trees, which extends the category Δ used in simplicial sets, whose presheaf category is the category of dendroidal sets. We show that there is a closed monoidal structure on dendroidal sets which is closely related to the Boardman-Vogt tensor product of operads. Furthermore we show that each operad in a suitable model category has a coherent homotopy nerve which is a dendroidal set, extending another construction of Boardman and Vogt. There is also a notion of an inner Kan dendroidal set which is closely related to simplicial Kan complexes. Finally, we briefly indicate the theory of dendroidal objects and outline several of the applications and further theory of dendroidal sets. (references: math.AT/0701293 and math.AT/0701295).

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