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Mapping spaces in quasi-categories.

Quasi-categories constitute one model for the theory of so called ∞ -categories, in which each ∞ -category is represented by a simplicial set. The vertices correspond to objects, the 1-simplices correspond to morphisms, the 2-simplices correspond to commuting triangles, etc. Quasi-categories were invented by Boardman and Vogt, illuminated by Joyal, and made a central tool and language for derived algebraic geometry by Lurie.

The difficulty that one seems to constantly run into is that there is no composition law in a quasi-category S . One can turn S into a simplicial category $\mathfrak{C}(S)$ (and hence get a composition law) using a Quillen equivalence, but it is difficult to compute mapping spaces in $\mathfrak{C}(S)$.

In this presentation, I will discuss joint work with Dan Dugger in which we make these mapping spaces explicit. I will also present some other models for the mapping spaces, and explain how they are all related. (Received September 14, 2009)