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*Homotopy theory of colored PROPs.*

PROPs are the big brothers of operads, that allow operations with many inputs and many outputs, while operads allow only operations with a single output. PROPs and their algebras have applications to various topics, including computer science, algebra, and physics. We are interested in defining model categories of colored PROPs and of algebras over a given colored PROP. For example, we showed that algebra structures over cofibrant PROPs are homotopy invariant under mild assumptions. Our primary application is to define a well-behaved “up to homotopy” version of TCFT, by working with algebras over a cofibrant replacement of the “Segal PROP”. (Received August 22, 2008)