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Generalized Polygraphs

Polygraphs (or equivalently computads) have been originally introduced for 2-categories by Street, and then generalized to strict infinity categories by Burroni, Street and Power, and then to many different settings by many peoples. They are the "free models" of some given Higher algebraic theory but where "free" is taken in a very specific and iteratively defined way. And they generally appear in connection to coherence and strictification problems for these higher structures.

I will present a general notion of "polygraphs for a generalized algebraic theory" that cover all the known examples and capture this general idea of free models. At this level of generality the category of polygraphs we obtain have very poor properties, so the key point is to understand how various assumptions on the theory allows to recover various classically expected or desired properties of these category of polygraphs - I will in particular start discussing the question of when these are presheaves categories.

The long term goal is to develop a more general understanding of how properties of the category of polygraphs relates to homotopy theoretic properties of the corresponding higher structures through coherence and strictification problems, but there is still a lot of work left to get there.

(Work in progress, joint with Daniel De Almeida Souza)