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Cosimplicial models for manifold calculus

Manifold calculus is a tool developped by Goodwillie and Weiss which enables to approximate a contravariant functor, F, from the category of m-manifolds to the category of spaces (or alike), by its "Taylor approximation", $T_\infty F$. I will explain how to construct a fairly explicit and computable cosimplicial model of $T_\infty F(M)$ out of a simplicial model of the manifold M (i.e. out of a simplicial set whose realization is M). This cosimplicial model in degree p is then equivalent to the evaluation of F on a disjoint union of as many m-disks as p-simplices in the simplicial model of M.

As an example, we apply this construction to the functor $F(M) = \mathsf{Emb}(M, W)$ of smooth embeddings in a given manifold W ; in that case our cosimplicial model in degree p is then just the configuration space of all the p-simplices of M in W product with a power of a Stiefel manifold. When $\dim(W) > \dim(M) + 2$, a theorem of Goodwillie-Klein implies that our explicit cosimplicial space is a model of $\mathsf{Emb}(M, W)$. This generalizes Sinha's cosimplicial model for the space of long knots which was for the special case when M is the real line. (This is joint work with Pedro Boavida de Brito, Pascal Lambrechts, and Daniel Pryor)