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Path space connections and categorical geometry

We study a type of connection form given by Chen integrals over pathspaces by placing such forms within a category-theoretic framework of principal bundles and connections. We introduce a notion of decorated “categorical principal bundles” and develop parallel transport on such bundles. If time permits, I will explore applications of our construction to specific examples in the context of path spaces.

This is joint work with Amitabha Lahiri and Ambar Sengupta.