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Arthur J Parzygnat* (aparzygnat@gc.cuny.edu), 365 Fifth Avenue, Physics Department, New York, NY 10016. *Two-dimensional iterated integrals and applications in classical gauge theory.*

One-dimensional iterated integrals can be phrased neatly in the language of category theory emphasizing key properties. Higher categories provide a framework for a simple generalization of these properties giving conceptually simple definitions of iterated integrals in higher dimensions. In this talk, we will discuss this generalization to surfaces using string diagrams to illustrate how iterated integrals should be thought of as “higher-dimensional algebra.” We will give a simple example from classical gauge theory by computing the magnetic flux through a sphere for an $SO(3)$ -monopole, i.e. by computing the surface holonomy along a sphere equipped with a nontrivial $SO(3)$ -bundle. (Received January 17, 2015)