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Chad Giusti* (cgiusti@udel.edu) and **Darrick Lee**. *Path space cochain models for time series analysis*. Preliminary report.

The space of time series on a population of observables can be naturally viewed as a path space on the space of population states. This language allows us to characterize various quantitative measures of time series as evaluations of 0-cochains on points in the space. Leveraging this perspective and applying classical cochain models for mapping spaces, we obtain a range of new algebraic and geometric tools for the study of time series. Here, we survey the background, starting with Chen's iterated integral construction, and then describe some initial results about how such tools can be used to study cyclic behavior, sequences of population states that occur at irregular intervals, and causality. (Received January 25, 2019)