

Isostables for Stochastic Oscillators

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The analysis of limit cycle systems through phase-amplitude reduction (*Guillamon and Hugué, 2008*) has been shown to provide an essentially complete understanding of deterministic oscillatory dynamics. For this reason, one may wonder about the potential insights such approach would provide if applied to stochastic oscillators. However, because of the fundamental differences between deterministic and stochastic dynamics, the stochastic analogue of such phase-amplitude variables has remained elusive.

In this poster, I would like to introduce the recent advances leading to the definition of the stochastic phase (*Lindner and Thomas, 2014*) and the stochastic amplitude (*Pérez-Cervera, Lindner and Thomas, 2021*). As discussed in the latter reference, the stochastic phase-amplitude variables allow to define an “effective vector field” generating an “effective limit cycle”. These objects capture the oscillatory behaviour *in the mean*. It would be my pleasure to discuss both objects, and the conceptual scheme they define, with the parameterisation method’s community.

This work is based on ongoing collaboration and discussions with Peter J. Thomas (Case Western Reserve University, Ohio, US) and Benjamin Lindner (Humboldt Universität zu Berlin, Germany).