Abstract Submitted
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Novel Stochastic Mode Reduction For General Irreversible Systems[1] MARKUS SCHMUCK, School of Mathematical and Computer Sciences and Maxwell Institute for Mathematical Sciences, Heriot-Watt University, Edinburgh EH144AS, MARC PRADAS, Department of Mathematics and Statistics, The Open University, Milton Keynes MK7 6AA, GRIGORIOS A. PAVLIOTIS, Department of Mathematics, Imperial College London, London SW7 2AZ, UK, SERAFIM KALLIADASIS, Department of Chemical Engineering, Imperial College London, London SW7 2AZ, UK — We outline a novel stochastic mode reduction strategy for nonlinear irreversible dynamical systems. Our methodology is based on the concept of maximum information entropy together with spectral characteristics of linear operators and a dynamic renormalization strategy [1,2]. It results in low-dimensional stochastic equations equipped with a systematically determined noise term. We demonstrate the performance and validity of our novel method with various physical model prototypes such as front propagation in reaction diffusion systems, phase separation in binary mixtures, and coarsening of interfaces. These are just a few examples demonstrating the wide applicability of our computational mode reduction.
1. M. Schmuck, M. Pradas, S. Kalliadasis & G.A. Pavliotis, Phys. Rev. Lett. 110:244101 2013.
2. M. Schmuck, M. Pradas, G.A. Pavliotis & S. Kalliadasis, IMA J.Appl. Math. 80:273-301 2015.

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