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Continuous Data Assimilation: Multiphysics and Nonlinear Feedback

We will discuss new nonlinear continuous data assimilation algorithms. These models will be compared with the linear continuous data assimilation algorithm introduced by Azouani, Olson, and Titi (AOT). As a proof-of-concept for these models, we computationally investigate these algorithms in the context of the 1D Kuramoto-Sivashinsky equation. We observe that the nonlinear models experience super-exponential convergence in time. We will also discuss new analytical results on linear anisotropic data assimilation for the 2D MHD equations.