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A Data-Driven Approach to Model Calibration for Nonlinear Plasma Behavior CHRISTINE GREVE, KENTARO HARA, Texas A&M University — The physics of low-temperature magnetized plasmas is complex and still poorly understood despite the use of a variety of modeling methods (fluid, kinetic, hybrid, etc.). The dynamic nature of this phenomenon has yet to be modeled in a predictive manner using physics-based simulations, as most models attempt to validate against steady-state experimental results. In this work, a data-driven model approach that solves the inverse problem with a reference solution, such as a set of experimental data, is used to search for appropriate input parameter values for a set of governing equations. Specifically, the characterization of a data-driven approach to model calibration using time embeddings and the first Wasserstein distance is presented in this work. The convergence properties of the proposed approach are studied using numerical solutions, though experimental training data will be used in the future. The data-driven modeling framework is applied to model the discharge plasma of Hall effect thrusters, illustrating its potential use for further understanding the fundamental plasma physics.

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