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Parameter Estimation for a Pulsating Turbulent Buoy- ant Jet Using Approximate Bayesian Computation JASON CHRISTOPHER, NICHOLAS WIMER, CAELAN LAPOINTE, TORREY HAYDEN, IAN GROOMS, GREG RIEKER, PETER HAMLINGTON, University of Colorado - Boulder — Approximate Bayesian Computation (ABC) is a powerful tool that allows sparse experimental or other "truth" data to be used for the prediction of unknown parameters, such as flow properties and boundary conditions, in numerical simulations of real-world engineering systems. Here we introduce the ABC approach and then use ABC to predict unknown inflow conditions in simulations of a two-dimensional (2D) turbulent, high-temperature buoyant jet. For this test case, truth data are obtained from a direct numerical simulation (DNS) with known boundary conditions and problem parameters, while the ABC procedure utilizes lower fidelity large eddy simulations. Using spatially-sparse statistics from the 2D buoyant jet DNS, we show that the ABC method provides accurate predictions of true jet inflow parameters. The success of the ABC approach in the present test suggests that ABC is a useful and versatile tool for predicting flow information, such as boundary conditions, that can be difficult to determine experimentally.

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