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Parameter Estimation for a Turbulent Buoyant Jet Using Approximate Bayesian Computation JASON D. CHRISTOPHER, NICHOLAS T. WIMER, TORREY R. S. HAYDEN, CAELAN LAPOINTE, IAN GROOMS, GREGORY B. RIEKER, PETER E. 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 model parameters in numerical simulations of real-world engineering systems. In this presentation, 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 simulation with known boundary conditions and problem parameters. Using spatially-sparse temperature statistics from the 2D buoyant jet truth simulation, we show that the ABC method provides accurate predictions of the true jet inflow temperature. The success of the ABC approach in the present test suggests that ABC is a useful and versatile tool for engineering fluid dynamics research.

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