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Nathan Glatt-Holtz*, Department of Mathematics, Tulane University, 70118 New Orleans, LA, Laos. *A Bayesian Approach to Quantifying Uncertainty Divergence Free Flows.*

We treat the statistical regularization of the ill-posed inverse problem of estimating a divergence free flow field \mathbf{u} from the partial and noisy observation of a passive scalar θ . Our solution is Bayesian posterior distribution, a probability measure μ which precisely quantifies uncertainties in \mathbf{u} once one specifies models for measurement error and prior knowledge for \mathbf{u} . We present some of our recent work which analyzes μ both analytically and numerically. In particular we discuss a posterior contraction (consistency) result as well as some Markov Chain Monte Carlo (MCMC) algorithms which we have developed and refined to effectively sample from μ . This is joint work with Jeff Borggaard and Justin Krometis (Virginia Tech). (Received August 08, 2018)