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Continuous Data Assimilation with Stochastically Noisy Data.

We analyze the performance of a data-assimilation algorithm based on a linear feedback control when used with observational data that contains measurement errors. Our model problem consists of dynamics governed by the two-dimension incompressible Navier–Stokes equations, observational measurements given by finite volume elements or nodal points of the velocity field and measurement errors which are represented by stochastic noise. Under these assumptions, the data-assimilation algorithm consists of a system of stochastically forced Navier–Stokes equations. Our main result provides explicit conditions on the observation density (resolution) which guarantee explicit asymptotic bounds, as the time tends to infinity, on the error between the approximate solution and the actual solutions which is corresponding to these measurements, in terms of the variance of the noise in the measurements. (Received September 21, 2015)