

* Electronic Address: azouani@math.fu-berlin.de

¹ Mohammed First University, National School of Applied Sciences Al Hoceima

² Texas A&M University, College Station

³ Department of Mathematics and Statistics, University of Nevada

⁴ Department of Chemical and Petroleum Engineering, University of Wyoming

Use of finite number of determining parameters and continuous data assimilation into feedback control

Abderrahim Azouani^{1*}, Edriss S. Titi², Eric Olson³, Masakazu Gesho⁴

We introduce a feedback control scheme for stabilizing solutions of infinite-dimensional dissipative dynamical systems. For more reaching applications, we present a new continuous data assimilation algorithm based on our feedback controls ideas in the context of the incompressible two-dimensional Navier-Stokes equations. This algorithm allows the use of any type of measurement data for which a general type of approximation interpolation operator exists. Our main result provides conditions, on the finite-dimensional spatial resolution of the collected data, sufficient to guarantee that the approximating solution, obtained by our algorithm from the measurement data, converges to the unknown reference solution over time.