



Estimation of the response to a forcing of high dimensional non-linear systems

F. C. Cooper and P. H. Haynes

University of Cambridge, United Kingdom (F.Cooper@damtp.cam.ac.uk)

We investigate the practical ability of the fluctuation-dissipation theorem (FDT) to predict the response to a forcing of a non-linear system with a high dimensional phase space. In high dimensional systems truncation of the state vector is often necessary for practical progress and we argue that a particular type of truncation may be appropriate. We choose as our test bed the chaotic Lorenz 95 system of ordinary differential equations with 36 and 72 variables. It is found that a truncation of the systems state vector, with the appropriate truncation predicted by a form of the FDT, improves the accuracy of the predicted response. We discuss the possibility of applying such a truncation to atmospheric data sets and additional truncations that may be necessary for accurate evaluation of the FDT.