

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Dynamic Mode Decomposition based on Kalman Filter for Parameter Estimation HISAICHI SHIBATA, Japan Aerospace Exploration Agency, TAKU NONOMURA, Tohoku University, JST Presto, RYOJI TAKAKI, Japan Aerospace Exploration Agency — With the development of computational fluid dynamics, large-scale data can now be obtained. In order to model physical phenomena from such data, it is required to extract features of flow field. Dynamic mode decomposition (DMD) is a method which meets the request. DMD can compute dominant eigenmodes of flow field by approximating system matrix. From this point of view, DMD can be considered as parameter estimation of system matrix. To estimate such parameters, we propose a novel method based on Kalman filter. Our numerical experiments indicated that the proposed method can estimate the parameters more accurately if it is compared with standard DMD methods. With this method, it is also possible to improve the parameter estimation accuracy if characteristics of noise acting on the system is given.

Hisaiichi Shibata
Japan Aerospace Exploration Agency

Date submitted: 27 Jul 2017

Electronic form version 1.4