

Ji Liu

Education

V.S. , Rensselaer Polytechnic Institute	2013~2014
Ph.D. , East China University of Science and Technology, China	2009
M.S. , Wuhan University, China	2002
B.S. , Wuhan University of Hydraulic and Electrical Engineering, China	1999

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Research

Currently I am conducting research on model reduction and state estimation of nonlinear large-scale chemical and biological processes. To be specific, the orthogonal wavelet operational method and the orthogonal collocation method have been respectively used for model reduction for further parameter identification and state estimation of linear, nonlinear distributed parameter systems. These reduction methods are in essence spatial discretization of models. The result is a high-dimensional model in order to satisfy the accuracy demand. On the other hand, It has been found that the unscented Kalman Filter (UKF) is preferable to the ordinary Kalman Filter and its extended term for the strong nonlinear processes. The UKF and square-root UKF (SR-UKF) are applied for state estimation of nonlinear systems. The accuracy, stability and computation cost were evaluated. Also to solve estimation problems with model mismatch, the adaptive UKF estimator has been proposed. Also, regularization of ill-conditioned estimation problem resulting from the model reduction is my interesting. That is to say, my research focuses on the UKF method and its applications to nonlinear high-dimensional systems. It aims at concluding a framework for state estimation of nonlinear high- or even infinite-dimensional systems.