

Accepted Manuscript

Revisiting APOD accuracy for nonlinear control of transport reaction processes:
a spatially discrete approach

Manda Yang, Antonios Armaou

PII: S0009-2509(17)30774-1
DOI: <https://doi.org/10.1016/j.ces.2017.12.037>
Reference: CES 13972

To appear in: *Chemical Engineering Science*

Received Date: 26 May 2017
Revised Date: 16 October 2017
Accepted Date: 18 December 2017

Please cite this article as: M. Yang, A. Armaou, Revisiting APOD accuracy for nonlinear control of transport reaction processes: a spatially discrete approach, *Chemical Engineering Science* (2017), doi: <https://doi.org/10.1016/j.ces.2017.12.037>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Revisiting APOD accuracy for nonlinear control of transport reaction processes: a spatially discrete approach

Manda Yang^a, Antonios Armaou^{a,b}

^a*Department of Chemical Engineering, The Pennsylvania State University, University Park, PA 16802, USA*

^b*Department of Mechanical and Automation Engineering, Wenzhou University, Chashan univeristy town, Zhejiang, China*

Abstract

This article addresses the problem of output feedback control of dissipative distributed parameter systems. The reduced order model used for controller and observer synthesis is recursively updated using a revised version of adaptive proper orthogonal decomposition (APOD), based on decomposing spatially discrete solution profiles. This approach eliminates the basis size oscillation resulting from the inaccuracy of estimation of energy in APOD when the sampling speed is too slow. The performance of this method is illustrated by applying it to regulate a diffusion-reaction process and a fluid flow system described by the Kuramoto-Sivashinsky equation.

Keywords: adaptive proper orthogonal decomposition, distributed parameter systems, process control, nonlinear control, model order reduction

Download English Version:

<https://daneshyari.com/en/article/6588589>

Download Persian Version:

<https://daneshyari.com/article/6588589>

[Daneshyari.com](https://daneshyari.com)