

Accepted Manuscript

A component mode selection method based on a consistent perturbation expansion of interface displacement

Soo Min Kim, Jin-Gyun Kim, K.C. Park, Soo-Won Chae

PII: S0045-7825(17)30398-5
DOI: <https://doi.org/10.1016/j.cma.2017.11.010>
Reference: CMA 11669

To appear in: *Comput. Methods Appl. Mech. Engrg.*

Received date: 2 March 2017
Revised date: 1 November 2017
Accepted date: 6 November 2017

Please cite this article as: S.M. Kim, J. Kim, K.C. Park, S.-W. Chae, A component mode selection method based on a consistent perturbation expansion of interface displacement, *Comput. Methods Appl. Mech. Engrg.* (2017), <https://doi.org/10.1016/j.cma.2017.11.010>

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.



A component mode selection method
based on a consistent perturbation expansion
of interface displacement

Soo Min Kim^a, Jin-Gyun Kim^{b,c}, K. C. Park^{a,d}, Soo-Won Chae^{a,*}

^a Department of Mechanical Engineering, Korea University,
145, Anam-ro, Seongbuk-gu, Seoul, 02841, Korea

^b Mechanical Systems Safety Research Division,
Korea Institute of Machinery and Materials,
156, Gajeongbuk-ro, Yuseong-gu, Daejeon, 34103, Korea

^c Department of Structural Engineering, Delft University of Technology,
Stevinweg 1, 2628 CN Delft, Netherlands

^d Department of Aerospace Engineering Sciences and Center for Aerospace Structures,
University of Colorado, Campus Box 429, Boulder, CO 80309, U.S.A.

Abstract

A mode selection method is presented for the reduced-order modeling (ROM) of structural systems in conjunction with the Craig-Bampton component mode synthesis technique. The proposed method is derived by using a consistent expansion of the interface displacement in terms of a frequency-dependent small parameter as applied to a Craig-Bampton-like ROM formulation. It is found that this procedure yields a coupling mechanism of the modes of the full model to those of substructures. The present mode selection method employs this coupling mechanism as an indicator, labeled as the CMS _{σ} method, for the substructural modal contributions to the full model. The performance of the proposed method is demonstrated by various numerical examples and compared favorably with existing method such as the CMS _{χ} method.

Keywords: Mode selection method, Moment-matching, Component mode synthesis, Reduced-order modeling, Structural dynamics

*Corresponding author

Email address: swchae@korea.ac.kr (Soo-Won Chae)

Download English Version:

<https://daneshyari.com/en/article/6915725>

Download Persian Version:

<https://daneshyari.com/article/6915725>

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