Accepted Manuscript

Damage Detection in Beam-like Composite Structures via Chebyshev Pseudo Spectral Modal Curvature

Zhi-Bo Yang, Maciej Radzienski, Pawel Kudela, Wieslaw Ostachowicz

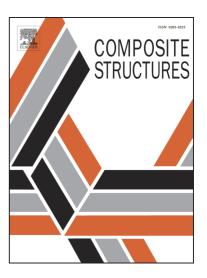
PII: S0263-8223(16)31893-1

DOI: http://dx.doi.org/10.1016/j.compstruct.2017.01.087

Reference: COST 8249

To appear in: Composite Structures

Received Date: 19 September 2016 Revised Date: 22 December 2016 Accepted Date: 10 January 2017



Please cite this article as: Yang, Z-B., Radzienski, M., Kudela, P., Ostachowicz, W., Damage Detection in Beamlike Composite Structures via Chebyshev Pseudo Spectral Modal Curvature, *Composite Structures* (2017), doi: http://dx.doi.org/10.1016/j.compstruct.2017.01.087

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.

ACCEPTED MANUSCRIPT

Damage Detection in Beam-like Composite Structures via Chebyshev Pseudo Spectral Modal Curvature

Zhi-Bo Yang^{a,b,c*}, Maciej Radzienski^c, Pawel Kudela^c, Wieslaw Ostachowicz^{c,d}

- ^a School of Mechanical Engineering, Xi'an Jiaotong University, 710049, Xi'an, P.R. China
- ^b The State Key Laboratory for Manufacturing Systems Engineering, 710049, Xi'an, P.R. China
- ^c Institute of Fluid Flow Machinery, Polish Academy of Science, 80-231 Gdansk, Poland
- ^d Faculty of Automotive and Construction Machinery, Warsaw University of Technology, 02-524 Warsaw, Poland

Abstract

This paper presents the Chebyshev pseudo spectral modal curvature formulation for damage detection in beam-like composite structures. The proposed method is the extension of authors' former work which is based on the Fourier spectral method. The Chebyshev pseudo spectral modal curvature overcomes the severe shortcomings of Fourier transform based spectral formulation which has serious problems associated with the wrap-around effect while analyzing the finite length signal. Moreover, the proposed method inherits the spatial filtering capability and spectral accuracy of the Fourier spectrum-based modal curvature, which ensures the robustness of the modal curvature calculation in noisy conditions. The validations of the presented method and comparisons with the Fourier spectrum based method are numerically and experimentally demonstrated for composite structures.

Keywords: Chebyshev pseudo spectrum, modal curvature, damage detection, composite beam, wavenumber domain filtering

Download English Version:

https://daneshyari.com/en/article/4912104

Download Persian Version:

https://daneshyari.com/article/4912104

<u>Daneshyari.com</u>