Scopus (/home.uri?zone=header&origin=searchbasic)

Document details

< Back to results (https://www.scopus.com/results/results.uri?sort=plf-f&src=s&st1=Using+Electromechanical+Impedance+and+Extreme+Learning&st2=&sid=6F3D59E4AB5E250AF11B5134F5F77BGEwsnAw8kcdt7IPYLO0V48gA%3
1 of 1

Export Download Print E-mail Save to PDF Add to List More... >

Journal of Nondestructive Evaluation (https://www.scopus.com/sourceid/21179?origin=recordpage)
Volume 36, Issue 2, 1 June 2017, Article number 39

Using Electromechanical Impedance and Extreme Learning Machine to Detect and Locate Damage in Structures (Article)

Djemana, M. (https://www.scopus.com/authid/detail.uri?authorId=57193744496&eid=2-s2.0-85018760360),
Hrairi, M. (https://www.scopus.com/authid/detail.uri?authorId=25823834900&eid=2-s2.0-85018760360) (mailto:meftah@iium.edu.my),
Al Jeroudi, Y. (https://www.scopus.com/authid/detail.uri?authorId=57194116388&eid=2-s2.0-85018760360)

Department of Mechanical Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia

Abstract

View references (23)

The main objective in structural health monitoring is to keep track of the changes in the dynamic characteristics of the structural system in order both to detect and locate the damage, and to make a decision automatically whether the damage is in dangerous level for the structure or not. In particular, electromechanical impedance (EMI) techniques give simple and low cost solutions for detecting damage in different structures. When it is question of damage localization, the simple analysis of the EMIs fails to furnish enough information. In this paper, an extreme learning machine (ELM) based algorithm is developed for estimating the damage location by using piezoelectric sensors data. The model is trained on simulation generated data and tested on experiments for estimating the damage location by using piezoelectric sensors data. The work's numerical results have been confirmed either experimentally using laboratory equipment or by employing results available in the open literature and a good agreement has been observed. Experimental results show that ELM can be used as a tool to predict of a single damage in structures. An overall accuracy of 84.5% is achieved with best accuracy of 95%. © 2017, Springer Science+Business Media New York.

Author keywords

Damage detection Damage location Electromechanical impedance Extreme learning machine Piezoelectric sensor Structural health monitoring

Indexed keywords

Engineering controlled terms: Damage detection Electric sensing devices Knowledge acquisition Laboratories Learning systems Location Piezoelectric devices Piezoelectric transducers Piezoelectricity