CMN 2015 – Accepted Abstract

Paper 55	
Title:	Piezoelectric Vibrations Energy Harvesters Power Optimization Using the Finite Element Method
Author keywords:	Piezoelectric Harvesters Finite Element Analysis Simulated Annealing
Topics:	ST10 - Recent Progresses in Derivative-Free Methods for Engineering Optimization
Abstract:	This paper presents a computational model using the finite element (FE) method to simulate piezoelectric vibrations energy harvesters for power optimization in the context of small size applications. A version of the simulated annealing algorithm is used to optimize power. Four common configurations, viz; longitudinal generator, transverse generator, unimorph and bimorph are considered. The electrical machine linked to the harvester is represented by a resistance. In the first part of the study, the FE model is validated. In the second part, the harvested power is optimized varying material orientation and changing piezoelectric material between BaTiO3 and PZT-5H in non-resonance for different 1Hz loadings. It is observed that the best material orientation changes with the loading type and the results are discussed. In the third part, the material orientation optimization is performed for near resonance frequency excitation for unimorph and bimorph configurations. The need to include material's hysteretic damping is demonstrated. Moreover, the optimal orientation near resonance excitation can be different from those obtained for 1 Hz. Results are shown and discussed. Also a parametric study is made for the harvested power with respect to the electric circuit resistance for the optimized configurations when excited near resonance frequencies.
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CMN 2015 notification for paper 55

1 message

CMN 2015 <cmn2015@easychair.org> Sat, Jan 31, 2015 at 11:38 PM
To: Agostinho Matos <ago.matoz@gmail.com>

Dear Agostinho Matos,

Thank you for submitting your work to the 2015 Congress on Numerical Methods in Engineering

We are pleased to announce that your abstract submission number55 "Piezoelectric Vibrations Energy Harvesters Power Optimization Using the Finite Element Method" was accepted for oral presentation at the Congress.

If you consider submitting a full-length paper to the Congress, please check the Congress webpage for authors' instructions for Word and LaTex.

Full-papers should be submitted also through the Easychair online system. Login into your Easychair account and from the My Submissions menu, select your submission. In the upper right corner of the page you should select Upload a new version and then upload the PDF file of your paper.

Please note the deadline for full-paper submission is March 31, 2015.

Presenting Authors should have a completed registration by April 30, 2015 in order to ensure Abstract/Paper publication. Only one presentation per registered author will be considered.

If you are the presenting author you should mention it in the registration form; Your paper ID 55will be asked.

Please check the Congress webpage for registration and important dates.

If you have any questions, please contact us by e-mail (cmn2015@dem.ist.utl.pt).

Looking forward to meet you in Lisbon next June.

With our best regards
The organizing committee