



Faculty Development Program



Event Outcome

Title : Dynamics of vibration energy harvesting with a shape memory spring

Date : 2025-09-01 - 2025-09-01

Time : 16:00 - 17:30

Venue : MB210

- The lecture enabled participants to gain a comprehensive understanding of how shape memory springs can be applied in vibration energy harvesting systems.



Resource Person 1 - Details

Name : Grzegorz Litak

Designation : Professor, Mechanical

University/ Company : Lublin UNiversity, Lublin

Address : poland, 632014.

Resource Person's Profile :

1. Profile of Grzegorz Litak

Prof. Grzegorz Litak is a distinguished scholar in the field of mechanical engineering and nonlinear dynamics, currently serving as a Full Professor and Head of the Department of Automation at the Faculty of Mechanical Engineering, Lublin University of Technology, Poland. He has made significant contributions to the study of nonlinear systems, bifurcation theory, chaotic dynamics, and nonlinear time series analysis, with his research also spanning areas of mechanical and production engineering.

This study investigates the dynamics of vibration energy harvesting using a shape memory spring as the core elastic element. Shape memory alloys (SMAs) possess unique nonlinear properties, such as superelasticity and hysteresis, which enable them to adaptively tune stiffness and damping under varying vibration conditions. By integrating a shape memory spring into a vibration-based energy harvester, the system exhibits enhanced energy conversion efficiency and broader operational bandwidth compared to conventional linear systems. The dynamic response, frequency tuning behavior, and energy output are analyzed to demonstrate how the nonlinear characteristics of SMAs can be exploited for harvesting ambient vibration energy. The findings highlight the potential of shape memory springs in developing adaptive and high-performance energy harvesting devices for practical applications in self-powered sensors and smart systems.

PPT

Coordinator's: Prof. SREEJA SADASIVAN 14486 - Associate Professor Grade 1 - SMEC

Prof. BIBIN JOHN 14032 - Professor Grade 2 - SMEC