THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

土木及環境工程學系
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SEMINAR

PASSIVE RECONSTRUCTION OF DISPERSION CURVE IN A THIN-PLATE STRUCTURE VIA FLOW-INDUCED RANDOM VIBRATION AND ITS APPLICATION IN SHM

Speaker

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Abstract

The ultrasonic guided wave is an efficient tool for structural health monitoring (SHM) due to its large inspection distance and high sensitivity to structural properties. However, the active guided wave method requires a signal generator and a power amplifier, which, in many scenarios of online monitoring, reduce the structural integrity and reliability and are also a heavy burden for power consumption. Flow-induced random vibration occurs naturally during, for example, the running process of an aircraft, a vehicle, or a ship, and produces a passive ultrasonic guided wave with no need for wave excitation equipment, which thus has the potential for the online SHM. In this talk, we will show how a flow-induced passive random guided wave can be used for the reconstruction of the dispersion curve of a thin-plate structure. Some detailed but important problems, including the effect of boundary reflection and sensor placement design, are introduced. An application of ice detection using the proposed methodology is also presented.

Biography

Dr. Xun Wang received his Ph.D. in "Estimation of multiple sound sources with data and model uncertainties" in Dec 2014 from the Sorbonne University - University of Technology of Compiègne, France. He was a postdoctoral fellow at the Aix-Marseille University, France, between Mar 2015 and Sept 2016 and a Research Associate at HKUST from Oct 2016 and Feb 2020. He joined the Beihang University, China, in Apr 2020 and has been a Full Professor since Feb 2022. Dr. Xun Wang has published over 40 research papers (including 26 first-author papers) in leading journals in acoustics, signal processing, and hydraulic/oceanic engineering. His research interests include acoustical inverse problems, acoustic imaging, structural health monitoring, and uncertainty quantification.

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