

Séminaire MEGA/EEAP

Distributed Point Source Method for Modelling Ultrasonic and Electromagnetic Wave Propagation in Solid/Fluid Media and Guided Wave based Ultrasonic NDE

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Amphithéâtre Emilie du Châtelet
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Abstract: Use of ultrasonic and electromagnetic waves is continuously increasing for nondestructive evaluation (NDE) and structural health monitoring (SHM) in civil, aerospace, electrical, mechanical and biomedical engineering applications. To extract the damage information from recorded signals one needs to understand the mechanics of wave propagation in various problem geometries and the interaction between propagating waves and internal defects in solids. Unfortunately, only for simple structures, such as homogeneous and layered half-spaces, unbounded plates, rods and pipes, the analytical solutions are available. Complex structures with internal defects are difficult to solve analytically or numerically by the popular finite element method because at high frequencies the size of the finite elements becomes prohibitively small. An alternative mesh-free technique called the distributed point source method (DPSM) is being developed for solving such problems. Current state of DPSM – recent advances and challenges - will be discussed in this presentation along with some experimental results for ultrasonic and electromagnetic wave based NDE.

Biography: Professor Kundu received his bachelor degree in Mechanical Engineering from the Indian Institute of Technology (IIT) Kharagpur in 1979, MS and PhD from UCLA in 1980 and 1983, respectively. He joined the University of Arizona in 1983 as an Assistant Professor and was promoted to Full Professor in 1994. Main focus of his research is nondestructive evaluation and structural health monitoring applied to engineering and biological materials. He has supervised 30 Ph.D. students, 20 MS students and published 270 technical papers with 131 journal publications. According to ISI Web of Science his citation index, h-index and g-index are over 1400, 20 and 30, respectively. He has also published 2 text books, edited 5 research monographs and 18 conference proceedings. He is a Fellow of ASME, ASCE and SPIE. For his research he received the Humboldt Research Prize (the Senior Scientist Award) from Germany in 2003 and Humboldt Fellowship in 1989 and 1996. In 2012 he was awarded the NDE Life Time Achievement Award from SPIE (Society of Optical Engineering) and in 2008 he received the Structural Health Monitoring Person of the Year award. He also received a number of Best Paper awards, plenary and keynote talk invitations and Invited professorship from foreign universities.