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Vibration and Buckling Analysis of Composite Panels with Consideration of Optimization

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Abstract

Much progress has been made over the last three decades in the development of increasingly more efficient composite structures and industries continue to investigate strategies for fully exploiting the potential of composites for a variety of structural forms including the laminated panels. A key advantage of composite laminates is the ability to tailor the mechanical properties of the laminate through lay-up design in addition to their potential for high specific stiffness and strength, and therefore efforts should be applied to fully optimize this tailoring process.

The structural analysis for vibration and buckling of the flat and curved panels has a long history of academic and practical interest, as summarized in a number of monographs. In the present keynote speech, analytical procedures for such structural issues are classified in some categories, and the development of basic plate and shell theories are overviewed with emphasis on composite materials. Then a technical history is summarized in the application of optimization methods, including both mathematical programming and metaheuristics such as genetic algorithms and particle swarm optimization.

Biography

Dr. Narita has been Professor in Mechanical Engineering at Faculty of Engineering, Hokkaido University, Sapporo, Japan until the retirement in March, 2017. He is now an academic advisor at Hasanuddin University in Makassar, Indonesia in JICA (Japan International Cooperation Agency) Project. His research interests cover analytical and computational aspects in solid mechanics and structural optimization. He is Honorary member of JSME and Fellow of JSCM, and has been a long time Editor-in-Chief in English journals in JSME, Associate editor in Applied Mechanics Reviews in ASME and Editorial Board member in Composite Structures (Elsevier). He has published more than 130 refereed research papers, 120 international conference proceedings, 10 book chapters and other form of reports. He is also interested in engineering education and international cooperation in higher education and research through his experiences as Director of European Office of Hokkaido University and the present position at one university in ASEAN countries.