

美国迈阿密大学杨庆大博士学术报告

题 目: Augmented Finite Element Method for Discrete Damage Modelling of Composites under Cyclic Loading

报告人: Qingda Yang

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Abstract

This presentation will demonstrate how to integrate such a fatigue CZMs into the augmented finite element (A-FEM) framework recently developed by Dr. Yang's group. Challenges arising from both numerical fronts (numerical instabilities, realistic representation of different types of cracks, compression induced mesh overlaps, etc.) and material fronts (fatigue damage accumulation characterizing, stiffness/strength loss, etc.) will be discussed and the strategies to overcome these challenges will be proposed. It will be demonstrated, through direct comparisons with experimental data of several composites, that the coupled A-FEM and fatigue CZM can indeed deliver high-fidelity assessment of fatigue damage accumulation in composites. In particular, its potential capability in accurately predicting the residual strength after arbitrary number of loading cycles is of significant practical importance because it leads to greatly reduced experimental inputs for composite safety design.

Biography of Dr. Qingda Yang



Dr. Qingda Yang is an associate professor of Mechanical and Aerospace Engineering at the University of Miami (Coral Gables, FL). He obtained his B.S. (Engineering Mechanics, 1991) and M. S. (solid mechanics, 1994) from Zhejiang University, China, and a PhD (Mechanical Engineering, 2000) from University of Michigan at Ann Arbor. Prior to joining University of Miami, Dr. Yang worked for Rockwell Scientific Company (formerly known as Rockwell Science Center) as a solid mechanics scientist from 2000 to 2006. Dr. Yang joined the faculty of the Department of Mechanical and Aerospace Engineering at the University of Miami in 2006 as an assistant professor. His research has attracted funding from many federal agencies (NSF, NASA, AFOSR, ARO, NAVY, and DARPA) and industrial companies (Teledyne, Boeing, and Vextec). Dr. Yang's recent research has focused mainly on developing multi-scale methodologies that can lead to realistic virtual testing and designing of complex heterogeneous materials and structures under general and/or extreme thermal-mechanical loading environments. Dr. Yang is an author/coauthor of 80 peer-reviewed journal publications, 4 book chapters, and more than 30 refereed conference proceedings. He is an editorial board member for the Journal of Applied Composite Materials and the journal of Multifunctional Composites. He was a past Chair of the Composite and Heterogeneous Materials Committee in ASME (2010-2012), and is currently serving as an executive board member for the Florida Space Grant Consortium (FSGC). Dr. Yang is an award recipient of several professional and academic societies, including the Eliahu I. Jury Award for excellence in research from the College of Engineering of the University of Miami (2007), University of Miami Prevost's General Research Award (2008), Rockwell Scientific's Technical Excellence Awards (2001; 2004; and 2005).