



Aerospace and Mechanical Engineering Seminar

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Peridynamic Modeling of Fiber-Reinforced Composites with Polymer and Ceramic Matrix

This study focuses on developing novel modeling techniques for fiber-reinforced composites with polymer and ceramic matrix based on a peridynamic approach. To capture the anisotropic material behaviors of composites under quasi-static and dynamic loading conditions, a new peridynamic model for composite laminate and a modified peridynamic approach for non-uniform discretization are proposed. The new peridynamic model for composite laminates does not have any limitation in fiber orientation, material properties and stacking sequence. It can capture the expected orthotropic material properties and coupling behaviors in laminates with symmetric and asymmetric layups. The modified peridynamic approach for non-uniform discretization enables computational efficiency and removes the effect of geometric truncations in the simulation. It also removes the requirement for correction of peridynamic material parameters due to surface effects. The accuracy and capability of these approaches are verified and validated by benchmark solutions and experimental measurements.

Bio:

Yile Hu is a Ph.D. candidate in the department of aerospace and mechanical engineering at the University of Arizona. He received his B.S. degree in aircraft manufacturing engineering from Tongji University in 2010 and his M.S. degree in aircraft design from Shanghai Jiaotong University in 2013. He served as instructor and teaching assistant for the Mechanics of Material lab class and won Outstanding Teaching Assistant from his department and the College of Engineering in spring 2015 and spring 2016. His primary area of research is peridynamic modeling of progressive damage in composite material under static and fatigue loading. He has published 15 journal and conference papers in the fields of mechanics and composite materials. At the AIAA SciTech 2017 conference, he received the Harry H. and Lois G. Hilton Student Paper Award in Structures.

AME Lecture Hall, Room S212

Thursday, Jan. 26, 2017

4 p.m.

Refreshments and socializing 3:45 p.m. at the east end of the AME Courtyard