

Multiscale Design System for Composite Materials and Structures

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In my talk I will present a multiscale design system (MDS) for composite materials and structures which integrates state-of-the-art multiscale analysis capabilities into commercial finite element software linked with an optimization package for model calibration and validation. The MDS has to design polymer based composite cars developed by a consortium of GM, FORD and Chrysler. The design system has been also applied for life prediction of JSF components (Rolls-Royce design). The MDS framework is currently being expanded to incorporate nanocomposites at finite temperature. This involves linking a molecular dynamics code for property prediction with a finite element code for component analysis. Both theoretical, computational and practical aspects will be discussed.