



15th LS-DYNA International Conference & Users Meeting

Post-Conference Training (2 day)

Wed & Thurs, June 12th & 13th, 2018, 9am-5pm

Edward Hotel & Convention Center, Dearborn, MI

Advanced FEM and Meshfree Methods for Manufacturing and Material Failure Simulation

Instructor: C. T. Wu & Bo Ren

Objective

This class covers various advanced FEM and meshfree methods for manufacturing and material failure/fragmentation analysis. The class will provide the introduction, fundamental background, the related LS-DYNA keywords, practical applications and their latest developments. Problem setup and several benchmark examples will be given in the workshops.

COURSE CONTENT

A. Destructive manufacturing

- 1) Application: grinding, riveting, cutting, flow drill screw, self-pierce riveting, self-tapping screw, drilling, ...
- 2) Features: workpiece-tool interaction and stress/thermal analysis
- 3) Approaches: SPG (Smooth Particle Galerkin), Peridynamics
- 4) Materials: metal, composite

B. Material failure and fragmentation analysis

- 1) Application: material failure in shells, impact and penetration, 3D crack propagation in solid, delamination and folding, fragmentation, failure in immersed/reinforced structures
- 2) Features: material failure/fragmentation due to dynamic wave propagation
- 3) Approaches: XFEM (Extended Finite Element), SPG (Smooth particle Galerkin), Peridynamics, coupling with other LS-DYNA solvers
- 4) Material: metal, concrete, rock and soil, composite, glass type brittle material, composite

C. Non-destructive manufacturing:

- 1) Application: forging, extrusion, spring back, compression molding
- 2) Features: large deformation, thermal-mechanical, implicit and explicit, coupled with ALE
- 3) Approaches: Adaptive FEM/EFG (Element-free Galerkin), SPG (Smooth Particle Galerkin)
- 4) Materials: metal, composite