



Locations:

Livermore Software Technology Corp.

7374 Las Positas Rd. Livermore, CA 94551

1740 West Big Beaver Road Troy, MI 48084

Contact: classes@lstc.com

www.lstc.com/training

Failure Analysis Using Advanced FEM and Meshfree Methods

Instructors: C. T. Wu & Y. Guo

2 Days - \$400 Students \$200 w/student ID

Includes on site continental breakfasts, lunches, breaks, class dinner

Includes 30-day LS-DYNA demo license to practice

Prerequisite: Students should be familiar with LS-PrePost and have a command of the LS-DYNA keywords and options associated with meshfree methods.

Description: This two-day class offers a comprehensive training on modeling material failure using several advanced FEM and meshfree methods in solids and structural analyses. The class will provide the detail description of each method, their related LS-DYNA keywords, practical applications and their interaction with LS-DYNA code. Numerous benchmark and industrial examples will be distributed in the class and workshop to demonstrate the capability of those methods as well as provide hand-on information on how to use them in real application. Journal articles and other documentations are available upon request.

Course contents

[1] Bond-based Peridynamics:

This explicit method is applied to brittle fracture analysis in the 3D solids. The method was implemented under the discontinuous Galerkin Finite Element framework. The fracture analysis in car windshields and other window glass is currently the main application. Other potential application in near future including composite laminates and thin shell structures will also be discussed in this class.

[2] Extended Finite Element Method

(XFEM): This method is applied to the non-branching failure analysis in semi-brittle and ductile shell structures. Several failure criteria will be described for the shell analysis. Current XFEM method uses shell element type 2 and type 16 as the base element. Pre-crack is allowed in the analysis.

[3] Smoothed Particle Galerkin (SPG)

Method: This method is developed for the semi-brittle and ductile failure analyses in solid mechanics applications. In this class, various material failure simulations will be utilized to demonstrate the capability of this method. Examples include but are not limited to metal cutting and screwing, concrete impact and penetration, composite drilling and other potential applications. This method can also be used to bridge the Lagrangian finite element method and is only available in LS-DYNA.