



USER DEFINED MATERIAL MODELING IN LS-DYNA

Objective of the course: The user-defined subroutines in LS-DYNA allow the program to be customized for particular applications. The usermat allow constitutive models to be added to the program. This course explains and demonstrates when to consider the use of such user subroutines and how to go about their developments. Detailed descriptions are given of the data required for the usermat, the additional statements to be included, the variable that are available within the subroutine, and the freedom the user has in defining complex material models.

Course Outline

- Chapter-0 Outline
- Chapter-1 Introduction and Objective
 - Subroutine Flow in the Fortran Files
- Chapter-2 Introduction to Nonlinear Continuum Mechanics
- Chapter-3 The Nonlinear Finite Element Dynamic Equation
- Chapter-4 Material Constitutive Equations
- Chapter-5 Steps Required in Writing a UserMat
- Chapter-6 User-define Material Subroutines Elastic
 - Elastic Material (shell and solid subroutines)
 - Orthotropic Material
 - Hyperelastic Material Subroutine
 - Viscoelastic Material Subroutine
- Chapter-7 User-define Material Subroutines Plastic
 - Plasticity & the Radial Return Algorithm
 - Elastic Plastic Material Subroutine
 - Piecewise Plasticity Subroutine
 - Strain Rate Depended Subroutine
- Chapter-8 Failure & User-define Subroutine
 - Failed Element & Nodes
- Chapter-9 Implicit User-define Subroutine
 - Elastic Isotropic Material
 - Nonlinear Composite Material
- Chapter-10 Other Applications in User-defined Subroutines
 - Temperature
 - EOS
- Chapter-11 References & Other Courses

There will be several examples, which are designed to understand and reinforce the lectures and the concepts presented. The course will provide users with experience of running and trouble-shooting LSDYNA usermat analysis.

