DYT101 - Introduction to Dytran

Dytran is designed to solve transient dynamic problems involving a high degree of nonlinearity. This seminar provides an introduction to the Lagrangian capabilities of Dytran. The primary emphasis is on how to use the program to solve engineering problems. The major capabilities of the program are covered in detail. The process of performing an analysis is discussed in its entirety, from initial modelling to the post processing of results. Hands-on workshops and example problems reinforce the material covered in the lectures. Advice is offered on modelling techniques, meshing, and evaluation of results. In addition, techniques to minimize the cost of analyses are discussed. By the end of the seminar, attendees should be able to apply Dytran to the solution of practical engineering problems in structural mechanics.

Pre-requisites:
Experience with a general-purpose finite element analysis application is recommended

Topics:

- Introduction
  - Overview of Dytran capabilities
  - Differences between Lagrangian and Eulerian technology
  - Overview of contact and Euler/Lagrange coupling techniques
  - Typical applications
- Explicit transient dynamic analysis
  - Introduction to explicit solution techniques
  - Explicit versus implicit technology
  - When to use explicit technology
- Input definition
  - Overview of the input file
  - Input file formats and data generation
  - File management system
  - Executive control
  - Case control
  - Bulk data
- Running the analysis
  - Modeling
  - Description of the Dytran files
  - Example input file
  - Restarts and rezones
  - Executing Dytran
  - Postprocessing using the XDEXTR translator
- Basic concepts of Lagrange
  - Theory
  - Computational cycle
  - User subroutine implementation
- Lagrangian capabilities
  - Element library

    - Material models
    - Loads and constraints
    - User subroutines
- Pre-stressing with MSC Nastran
- Concept of surfaces in Dytran
    - Surface definition
    - Defining segments
    - Surface modeling
- Lagrangian Interaction Capabilities
    - Contact
    - Tied connections
    - Kinematic connections
    - Breakable connections
- Modeling techniques
    - Mesh design
    - Problem simplification
    - Postprocessing
    - Results interpretation