REGISTRATION FORM

I herewith register for ...

☐ Information day (free of charge):
Multiphysics with LS-DYNA
4 March 2013, Stuttgart, Germany

☐ Seminar: CFD Solvers and FSI in LS-DYNA:
Introduction and Applications
5 - 6 March 2013, Stuttgart, Germany
☐ Industry: 1.100,– Euro ☐ Univ.: 550,– Euro *

☐ Seminar: Electromagnetic Field Solver in LS-DYNA:
Introduction and Applications
7 March 2013, Stuttgart, Germany
☐ Industry: 550,– Euro ☐ Univ.: 275,– Euro *

☐ Please add me to your mailing list.

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Please complete and fax to +49(0)711-459600-29, send to DYNAmore GmbH, Industriestr. 2, D-70565 Stuttgart, Germany, or E-mail to seminar@dynamore.de. Online registration at www.dynamore.de/seminars

* VAT if applicable

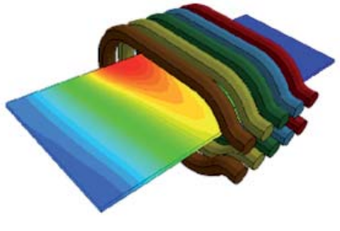
SOFTWARE

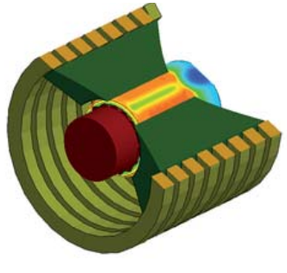
LS-DYNA

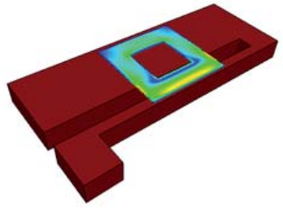
LS-DYNA is a highly-advanced general-purpose finite-element program that is capable of simulating complex real world problems far beyond the code's origins in nonlinear, transient dynamic finite-element analysis using explicit time integration. Thus, it is not only used by the automotive industry but is also highly appreciated in the aerospace, construction, military, manufacturing, and bioengineering industries and research institutes. The shared and distributed memory solver provides very short turnaround times on desktop computers operated using Linux, Windows, and UNIX (32bit oder 64bit) as well as on various cluster and HPC systems.

With LS-DYNA, the Livermore Software Technology Corporation (LSTC) provides a fully loaded tool box with efficient spatial and temporal discretization methods, which enable the seamless solution of coupled problems, even on multiple stages. This includes the class of volume- and surface-coupled problems and refers to the coupling possibilities of the structural solver with the solvers for incompressible and compressible fluids, temperature and electromagnetism.

Moreover, within LS-DYNA, it is possible to join different simulation phases without the necessity to define a tedious and time-consuming transfer to other software packages. Following this, a combination of the features provided by LS-DYNA easily allows for an integrative simulation of different mutually interacting physical phenomena on multiple scales.







DYNAmore/COURSE INSTRUCTOR

DYNAmore GmbH
Gesellschaft für FEM Ingenieurdienstleistungen

DYNAmore is dedicated to support engineers to solve non-linear mechanical problems numerically. Our tools to model and solve the problems are the finite-element software LS-DYNA as solver and LS-OPT for optimization.

We sell, teach, support, and co-develop the software LS-DYNA and LS-OPT. In addition we provide engineering services for numerical analysis and integrate simulation software in your CAE environment. The majority of our customers are from the automotive and aerospace industry.

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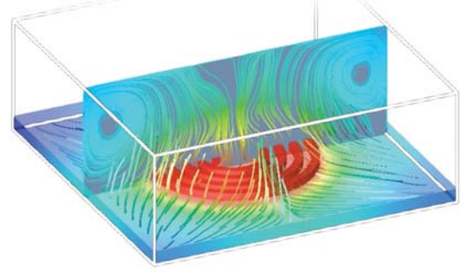
Information on the course instructor

Iñaki Çaldichoury is a software developer at LSTC and his area of operation is fluid mechanics as well as electromagnetism. He was significantly involved in the development and implementation of the new solvers for fluids and electromagnetic fields and has an excellent understanding of the theoretical background as well as the practical application.

FSC Printed on paper made from 60% FSC certified recycled fibres and 40% FSC certified pulp.

Invitation to the event series

Multiphysics applications using LS-DYNA



Information day:

Multiphysics with LS-DYNA	4 March

Seminars:

CFD Solvers and FSI in LS-DYNA: Introduction and Applications	5 - 6 March
Electromagnetic Field Solver in LS-DYNA: Introduction and Applications	7 March

Information day: Multiphysics with LS-DYNA

The modern term „multiphysics" can be understood as a synonym for the solution of generally coupled problems. Following this, multi-physical applications are often classified according to the nature of their coupling in terms of a weak or strong interaction of the involved processes, methods, materials, physical fields or scales as well as combinations thereof. Moreover, the interacting quantities may result in either volume- or surface-coupled problems. Thus, the success of multi-physical simulations strongly depends on the coupling abilities of the underlying simulation platform. In the case of LS-DYNA, this is achieved in a unified simulation environment.

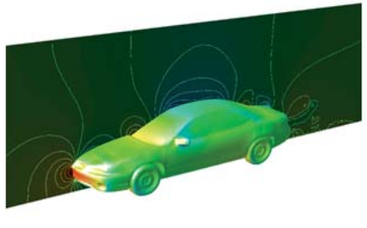
The goal of this information day is to enlarge upon the basic difficulties with the set-up of multi-physical simulations and to provide suitable solutions by embracing the available discretization schemes in space and time in LS-DYNA. In particular, a great variety of finite elements in a Lagrangean, Eulerian or Arbitrary-Lagrange-Eulerian formulation can be coupled with boundary elements, isogeometric elements or even meshfree methods like SPH, EFG or DEM. Moreover, implicit as well as explicit time integration schemes are provided and can be combined depending on the strength of the coupling.

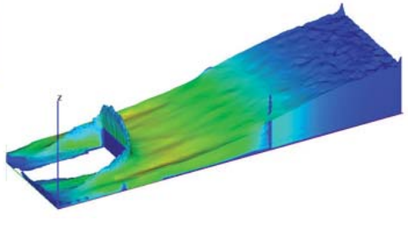
On the basis of practical examples, an overview on the current coupling abilities in LS-DYNA is given. Herein, the attention is mainly on the mutual interaction of solids and fluids with thermal and electromagnetical fields.

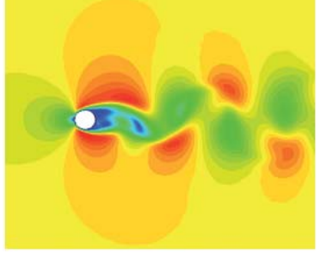
Agenda

13:00	Welcome and Introduction Dr.-Ing. N. Karajan (DYNAmore)
13:10	CFD Solvers and Interaction Possibilities in LS-DYNA R7 I. Çaldichoury (LSTC)
14:00	Interaction Possibilities of Bonded and Loose Particles in LS-DYNA Dr.-Ing. N. Karajan (DYNAmore)
14:30	Break
15:00	Electromagnetic Field Solver and its Thermo-Structural Coupling in LS-DYNA R7 I. Çaldichoury (LSTC)
15:50	Advanced Metalforming Simulation using a Thermo-Mechanical Coupling Including Phase Changes D. Lorenz (DYNAmore)
16:20	Discussion
16:50	End

Date: 4 March, 13:00 - 16:50
Type: Information day
Fees: Free of charge
Location: DYNAmore headquarters Stuttgart
Lecturers: See agenda
Language: English
Registration at www.dynamore.de/info_mp13-en







CFD Solvers and FSI in LS-DYNA: Introduction and Applications

This course provides an introduction to the incompressible fluid solver (ICFD) in LS-DYNA. It focuses on the solution of CFD problems, where the incompressibility constraint may be applied, e. g. ground vehicle, aerodynamics, hemodynamics, free-surface problems, ship hydrodynamics, etc. The solver may run as a stand-alone CFD solver, where only fluid dynamics effects are studied, or it can be coupled to the solid mechanics solver to study loosely or strongly coupled fluid-structure interaction (FSI) problems.

The course includes a presentation of the general principles and applications of the solver, a step by step guide to setting up a simple CFD problem, advanced feature introduction (FSI, conjugate heat transfer) and so forth. A brief review of basic fluid mechanics and CFD concepts are also offered such that no expert knowledge of fluids is required. Finally, a short introduction to the new compressible CESE solver specialized in supersonic flows and shockwave capturing is also given.

Contents

- Introduction and applications
- General principles
- Fluid mechanics and CFD concepts
- Fluid volume meshers
- FSI and thermal coupling
- Setting up a pure CFD problem
- Step by step keyword description
- Mesh refinement tools
- Multi-phase problems
- User defined mesh
- Coupling with structural/thermal LS-DYNA solvers
- Loose FSI coupling
- Strong FSI coupling
- Conjugate heat transfer problems
- Advanced controlling and watching tools
- Introduction to the CESE compressible flow

Dates: 5 - 6 March, 9:00 - 17:00
Type: Seminar
Fees: 1.100,– Euro plus VAT
50 % discount for universities
Location: DYNAmore headquarters Stuttgart
Lecturer: I. Çaldichoury (LSTC)
Language: English
Registration at www.dynamore.de/cfd-fsi13-en

Electromagetic Field Solver in LS-DYNA: Introduction and Applications

This course provides an introduction to the Electromagnetics (EM) solver in LS-DYNA. The Maxwell equations are solved in the Eddy-Current approximation suitable for cases, where the propagation of electromagnetic waves in air (or vacuum) can be considered as instantaneous. The solver is coupled with the solid mechanics and thermal solvers of LS-DYNA allowing the simulation and solution of applications such as magnetic metal forming, welding, bending, induced heating, resistive heating and so forth.

The course includes a presentation of the solver's general principles and applications, a complete keyword description for setting up an Eddy-Current problem, an introduction to the more advanced features (Inductive heating problems, exterior magnetic field, magnetic materials and so forth) as well as an advanced description of the available controlling tools to ensure a safe analysis. Key electromagnetic concepts are reviewed throughout the course and a general knowledge about electromagnetics is therefore appreciated but not mandatory.

Contents

- Introduction and applications
- General principles
- Maxwell equations
- FEMSTER library
- FEM and BEM coupled system
- Setting up an EM problem step by step
- The EM timestep
- Circuits
- EM materials and equation of states
- Advanced functionalities
- Controlling and monitoring the analysis

Date: 7 March, 9:00 - 17:00
Type: Seminar
Fees: 550,– Euro plus VAT
50 % discount for universities
Location: DYNAmore headquarters Stuttgart
Lecturer: I. Çaldichoury (LSTC)
Language: English
Registration at www.dynamore.de/em13-en