ADDRESS FOR MAIL DELIVERY

DYNAmore GmbH
Industriestr. 2
D-70565 Stuttgart
Germany

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/LECTURER

DYNAmore GmbH
Gesellschaft für FEM Ingenieurdienstleistungen

DYNAmore is dedicated to support engineers to solve nonlinear 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. Many companies value the services of DYNAmore. Customers of DYNAmore are:

- 13 of the 15 biggest car companies
- 11 of the 15 world wide biggest automotive suppliers
- All automotive OEM located in Germany
- 9 of the 10 largest German automotive suppliers
- The vast majority of German engineering services companies for crash simulation
- Almost all automotive OEM world wide use the dummy models developed by DYNAmore

The majority of suppliers for crash relevant parts in the automotive industry use LS-DYNA. LS-DYNA is likely to be the most frequently used explicit finite element code.

You find DYNAmore in Stuttgart, Dresden, Ingolstadt, Berlin, Langlingen, Zurich (CH), Linköping (S), Gothenburg (S) and Torino (I).

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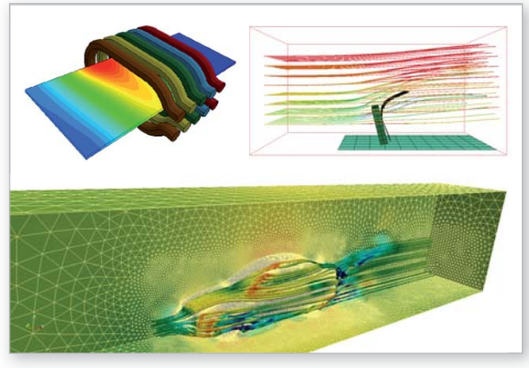
Information on the lecturer

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

New Solvers in LS-DYNA R7 for Electromagnetism and Computational Fluid Dynamics



Seminar: Electromagnetism (EM) Solver	18 March
Seminar: Compressible Fluid (CESE) Solver	19 March
Seminar: Incompressible Fluid (ICFD) Solver	20-21 March

ELECTROMAGNETISM (EM)

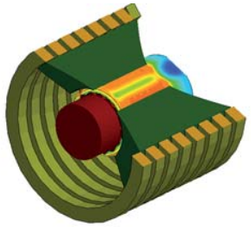
Electromagnetism (EM) Solver in LS-DYNA

This course provides an introduction to the Electromagnetics (EM) solver in LS-DYNA. Herein, the Maxwell equations are solved in the Eddy-Current approximation, which is 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

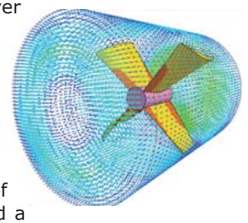
- Introduction and applications
- General principles
- Maxwell equations
- FEMSTER library
- FEM and BEM coupled system
- Setting up an EM problem step by step
- The EM timestep
- Circuits
- EM materials and equation of states
- Advanced functionalities
- Controlling and monitoring the analysis

Date: 18 March
Fees: 550 Euro plus VAT, 50 % discount for universities, students free of charge, provided there are vacancies
Location: DYNAmore Stuttgart
Lecturer: I. Çaldichoury (LSTC)
Language: English
Registration at www.dynamore.de/em-e

COMPRESSIBLE FLUID (CESE) SOLVER

Compressible Fluid (CESE) Solver in LS-DYNA

Compressibility effects in fluid mechanics are typically considered significant if the Mach number of the flow exceeds 0.3 or if the fluid undergoes very large pressure changes. The most distinct phenomenon associated with high speed flows is the existence of shock waves or non-isentropic solutions.



The new compressible flow solver CESE in LS-DYNA is based on a novel numerical framework originally proposed by Dr. Chang of the NASA Glenn Research Center. The method exhibits many non-traditional features, including a unified treatment of space and time, the introduction of a conservation element (CE) and a solution element (SE), and a novel shock capturing strategy without using a Riemann solver, which is able to simultaneously capture both strong shocks and small disturbances. Moreover, the spatial gradients are treated as unknowns which allows for more accurate solutions of the shock waves than normal second order schemes.

So far, this method has been used to solve many different types of flow problems, such as detonation waves, shock/acoustic wave interaction, cavitating flows, and chemical reaction flows. In LS-DYNA, it has been extended to also solve fluid-structure interaction (FSI) problems with the embedded (immersed) boundary approach or moving (fitted) mesh approach.

Contents

- Introduction and applications
- General principles
- The CE/SE scheme
- Setting up a pure CFD/CESE problem
- Setting up a FSI/CESE problem
- Advanced capabilities
- Post treatment
- Documentation

Date: 19 March
Fees: 550 Euro plus VAT, 50 % discount for universities, students free of charge, provided there are vacancies
Location: DYNAmore Stuttgart
Lecturer: I. Çaldichoury (LSTC)
Language: English
Registration at www.dynamore.de/cese-e

INCOMPRESSIBLE FLUID (ICFD) SOLVER

Incompressible Fluid (ICFD) Solver in LS-DYNA

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.

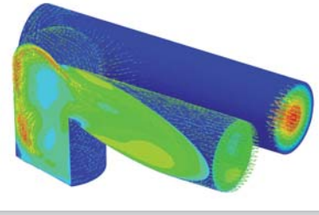
The solver may run as a stand-alone CFD solver, where only fluid dynamics effects are studied, or it can be coupled to the solid mechanics solver to study loosely or strongly coupled fluid-structure interaction (FSI) problems.

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.

Contents

- Introduction and applications
- General principles
- Fluid mechanics and CFD concepts
- Fluid volume mesher
- Setting up a pure CFD problem
- Step by step keyword description
- Mesh refinement tools
- Multi-phase problems
- User defined mesh
- Advanced controlling and monitoring tools
- FSI and thermal coupling
  - Loose FSI coupling
  - Strong FSI coupling
  - Conjugate heat transfer problems

Date: 20 - 21 March
Fees: 1.100 Euro plus VAT, 50 % discount for universities, students free of charge, provided there are vacancies
Location: DYNAmore Stuttgart
Lecturer: I. Çaldichoury (LSTC)
Language: English
Registration at www.dynamore.de/icfd-e



REGISTRATION FORM

I herewith register for ...

☐ Electromagnetism (EM) Solver in LS-DYNA
18 March 2014, Stuttgart, Germany
☐ Industry: 550 € ☐ University: 275 €

☐ Compressible Fluid (CESE) Solver in LS-DYNA
19 March 2014, Stuttgart, Germany
☐ Industry: 550 € ☐ University: 275 €

☐ Incompressible Fluid (ICFD) Solver in LS-DYNA
20-21 March 2014, Stuttgart, Germany
☐ Industry: 1.100 € ☐ University: 550 €

Students free of charge, provided there are vacancies.

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Online registration at www.dynamore.de/seminars

All costs plus VAT if applicable.

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With your registration you allow us the use and the processing of your data for seminar organization and own promotional purposes. You may at any time revoke these commitment. For this, please contact DYNAmore GmbH by phone or in writing.