http://congress.cimne.upc.es/complas05/course

Accommodation

The organizers have arranged block reservations with Husa Hotels Chain in different hotel categories, offering special rates to the COMPLAS participants. Please, note that block reservations expire on 7th July 2005. See details on:
http://congress.cimne.upc.es/complas05/frontal/Acom.asp

Registration Fees

The fee for the course is **350 €**.
This includes extended course material, coffee and lunch on September 2nd.

Grants: A number of grants is available. Interested persons please contact the Course Secretariat.

The **reduced combined fees** for participants to both the course and COMPLAS Conference are:
Delegates: **690 €**
Students: **400 €**

For more information on the COMPLAS conference visit the web address given below.

REGISTRATION MUST BE PERFORMED ELECTRONICALLY VIA THE COURSE WEB SITE:
http://congress.cimne.upc.es/complas05/course

Location

The short course will take place at the CIMNE Conference Room, Universitat Politècnica de Catalunya, Edificio C1, Campus Norte UPC, Gran Capitán s/n, 08034 Barcelona, Spain

Secretariat:

International Center for Numerical Methods in Engineering (CIMNE)
COMPLAS SECRETARIAT
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Supporting Organisations

Supported by the European Union Marie Curie Conference an Training Course EUA4X Contract number (MSCF-CT-2004-013336)
http://europa.eu.int/mariecurie-actions

University College of Swansea
www.engineering.swan.ac.uk

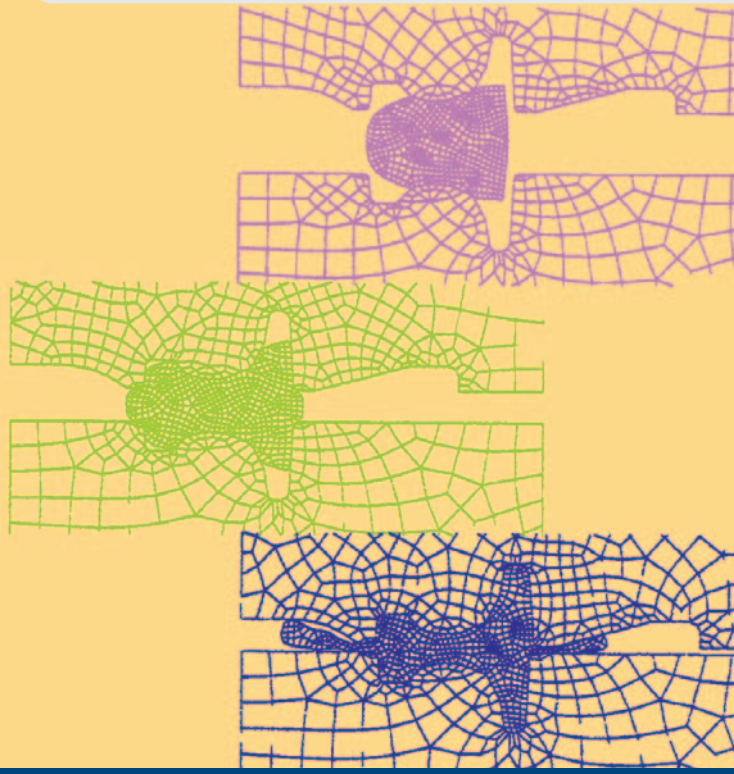
Universitat Politécnica de Catalunya
www.upc.es

COMPLAS Course

Eighth Short Course on

Computational Techniques for Plasticity

2-3 September 2005, Barcelona, Spain



In conjunction with the 8th International Conference on Computational Plasticity: Fundamentals and Applications, COMPLAS 2005

This is a course to be run in conjunction with the 8th International Conference on Computational Plasticity - COMPLAS 2005, Barcelona 5-8th September 2005. The pre-conference course should be of benefit to participants interested in acquiring a detailed and in-depth description of the application of finite element techniques to a range of plasticity problems; particularly those involving finite strains. The course can be attended separately from the conference, but a reduced combined fee is available to participants in both events.

Lecturers

D. R. J. Owen, D. Peric & E. A. de Souza Neto — University of Wales Swansea, UK

E. Oñate, C. Agelet, A. Huespe and S. Oller — Universitat Politecnica de Catalunya, Barcelona, Spain

Objectives

The purpose of the course is to present and demonstrate the use of finite element based methods for the solution of problems involving plasticity.
Particular attention will be devoted to finite strain conditions, with consideration being given to both rate independent and rate dependent situations. The use of numerical techniques is essential for solving problem involving complex geometry and including non-linear geometrical and material behaviour and such computations are being increasingly undertaken in industrial and research environments. The continuing advances in workstation technology and future hardware developments will accelerate the acceptance of such numerical techniques for commercial analysis and design.

There have been significant advances in the last few years in the development of robust and efficient solution procedures for elasto-plastic problems.
In particular, the treatment of finite strain plasticity problems has reached a sufficient stage of maturity for the solution of practical problems to be undertaken with confidence.
The course considers rate independent (quasi-static) and rate dependent (viscoplastic and dynamic) situations for both infinitesimal and finite strain conditions.

In addition to establishing the fundamental theoretical expressions in a form suitable for numerical implementation, emphasis is placed on the development and implementation of consistently linearised algorithms to ensure quadratic convergence rates. Other topics associated with the simulation of practical problems will be covered; including contact/friction modelling, damage evolution, advanced constitutive models and adaptive meshing concepts.

The course will also provide a short introduction to the topic of discrete elements which, when used in conjunction with conventional finite elements, provide a powerful procedure for several important classes of problems, such as multi-fracturing solids.

Consideration will be given to the practical difficulties encountered in the solution of industrial problems and time will be devoted to general discussion and the provision of specific problem advice.

Programme

Friday 2th September

9.00-11.00 **Computational plasticity - Basic principles and theory, *D. Peric***
- Introduction to elasto-plasticity and viscoplasticity
- The basic approach to incremental solution - consistent linearisation
- Finite element modelling

11.00-11.30 Coffee

11.30-13.30 **Elasto-plasticity/viscoplasticity with finite strains, *D. Peric and E. A. de Souza Neto***
- Fundamentals
- Constitutive modelling - Hyperelastic & plasticity relations
- Operator split methodology for numerical integration of the constitutive model
- Mesh adaptivity procedures

13.30-15.00 Lunch

15.00-16.00 **Further issues in plasticity modelling, *E. A. de Souza Neto***
- Treatment of singular and other yield surfaces
- Single crystal models

16.00-17.00 **Element technology, *E. A. de Souza Neto***
- Incompressibility issues
- Element formulations

17.00-17.30 Coffee

17.30-18.30 **Explicit time integration procedures for solids and shells, *E. Oñate***
- Stabilized formulation for quasi/full incompressible solids
- Advanced rotation-free shell elements
- Applications to bulk forming, impact and sheet stamping processes

Saturday 3rd September

9.00-10.00 **Thermo-mechanical problems with phase change, *C. Agelet de Saracibar***
- Fundamental formulation
- Implementation issues
- Applications to casting problems
- Industrial casting applications

10.00-11.00 **Computational Material Failure, *A. Huespe***
- Strain softening and localization
- Strong discontinuity approach
- Numerical examples

11.00-11.30 Coffee

11.30-12.30 **Plastic damage approach to fatigue modelling, *S. Oller***
- Concepts of plastic damage
- Computational formulation of fatigue problems
- Numerical examples

12.30-13.30 **Discrete element approaches to multi-fracturing solids, *D. R. J. Owen***
- Fundamentals of discrete elements
- Continuum to discrete transformation
- Numerical examples.

13.30-14.30 **General discussion & course closure**