DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

The 2011 DCAMM Annual Seminar Speaker

Paulo A.F. Martins

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will give the following two lectures in November 2011 at

Aalborg University
in Auditorium 1.208, Fibigerstræde 16, 9220 Aalborg Øst

Finite Element Flow Formulation: Accuracy, Reliability and Validity in Metal Forming Applications

(Specialist Lecture)

Wednesday, November 30, at 10:00

Finite Element Flow Formulation: Fundamentals and Computer Implementation

(General Lecture)
The lecture aims at popularizing mechanical science to a broad audience of interested students and staff as well as engineers working in industry.

Wednesday, November 30, at 13:00

See **abstract** of the lectures on the following page.

A reception will be held after the last lecture.
All are welcome!

The Danish Centre for Applied Mathematics and Mechanics, DCAMM, is a framework for internationally oriented scientific collaboration between staff members at a number of departments at the Technical University of Denmark and Aalborg University. The "DCAMM Annual Seminar Speaker" is an initiative created to disseminate mechanics to a broader audience.

For further information on DCAMM, see www.dcamm.dk.

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AALBORG UNIVERSITET

The 2011 DCAMM Annual Seminar Speaker

Aalborg University

in Auditorium 1.208, Fibigerstræde 16, 9220 Aalborg Øst

Finite Element Flow Formulation: Accuracy, Reliability and Validity in Metal Forming Applications

Finite Element Flow Formulation: Fundamentals and Computer Implementation

By

Paulo Martins

Professor of Manufacturing
Technical University of Lisbon
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Abstract:

Taking a general view of the present state of the art in terms of modelling and computation of metal forming processes it appears that the finite element flow formulation is one of the most widespread numerical methodologies for the analysis of complex industrial processes.
The finite element flow formulation is capable of providing very efficient computer programs that can easily take into account the practical non-linearities in the geometry and material properties as well as the contact change typical of metal forming processes to produce accurate predictions of displacements, strain rates, strains, stresses, damage and temperature throughout the workpiece.
However, in contrast to the active role performed by several metal forming research groups during the theoretical and numerical developments that were produced during the 80's and 90's, currently practice seems to indicate a total or near-total engagement of the majority of these groups on applications rather than on developments. A critical gap is now being formed between the developers of the computer programs and the users having the know-how on the metal forming technology. In fact, the present relationship between developers and users seems more like a marriage below one's station.
This set of lectures is concerned with the above-mentioned gap between developers and users and it is designed with a two-fold objective: (i) to provide attendants with a better understanding of the fundamental ingredients that are necessary to develop and proper utilize metal forming computer programs based on the finite flow formulation and (ii) to draw from the fundamentals of the flow formulation to aspects of accuracy, reliability and validation in numerical modeling of metal forming processes. The lectures are supported by examples of the finite element flow formulation for developing new products and increasing know-how on existing metal forming processes.

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