ETH

Eidgenössische Technische Hochschule Zürich
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Institut für Energietechnik: Prof. R.S. Abhari (LEC), Prof. K. Boulouchos (LAV)
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Institut für Fluiddynamik: Prof. P. Jenny, Prof. T. Rösgen
Computational Science & Engineering Laboratory: Prof. P. Koumoutsakos

30/10/2014

E I N L A D U N G

zu einem Vortrag im Rahmen des

Kolloquiums Thermo- und Fluiddynamik

Datum: **Mittwoch, 26. November 2014**

Zeit: ***>> 15:15 Uhr <<***

Ort: Maschinenlaboratorium ETH Zürich
>> Hörsaal ML H 37.1 <<

Referent: **Prof. Dimitris Goussis**
School of Applied Mathematics and Physical Sciences
National Technical University of Athens, Greece

Titel: **New Developments in Singular Perturbation Analysis**

Singular Perturbation analysis is a very important topic in Mathematics and is widely used in Engineering and Natural Sciences. The classical singular perturbation theory grew mainly due to the need to study celestial mechanics and its foundations go back to the papers of Henri Poincare and Thomas Stieltjes, both published in 1886. Significant contributions were provided in the middle of the 20th century, that systematized the existing theories. Since then, significant physical understanding has been acquired in a large number of phenomena related to the fields of Mechanical, Chemical and Electrical Engineering, Physics, Chemistry, Biology, etc.

The traditional Singular Perturbation analysis is hindered by the requirements to set the mathematical model in the proper non-dimensional form, to find the proper small parameters and to identify the number of fast time scales and of the fast variables. Clearly, the successful completion of these tasks is very difficult, when dealing with the complex systems that are of interest today.

In this seminar an algorithmic methodology will be presented that can perform singular perturbations analysis, which is not hindered by these problems or the size of the mathematical model. This algorithm was developed within the framework of the Geometric Singular Perturbations theory that focuses on the structures that develop in phase space, on which the neighboring trajectories are attracted.

Simple examples from combustion and biology will demonstrate the usefulness of the algorithm.

Host: Dr. Ch. Frouzakis, Prof. K. Boulouchos

Gäste sind willkommen!

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