An ECCOMAS Advanced online Course on Computational Structural Dynamics

Institute of Thermomechanics
Czech Academy of Sciences
and
Faculty of Civil Engineering,
Czech Technical University
in Prague

Czech Republic

August 31- September 4, 2020

Lecturers

Prof. K.C. Park
University of Colorado,
Boulder, USA
Prof. Petr Krysl
University of California,
San Diego, USA
Prof. Alexander Popp
Bundeswehr University Munich,
Germany
Prof. Jaroslav Kruis
Czech Technical University in Prague,
Czech Republic
Prof. José González
Universidad de Sevilla, Spain
Dr. Anton Tkachuk
University of Stuttgart, Germany
Dr. Radek Kolman
Institute of Thermomechanics,
Prague, Czech Republic
Dr. Ján Kopačka
Institute of Thermomechanics,
Prague, Czech Republic
Dr. Martin Isoz
Institute of Thermomechanics,
Prague, Czech Republic
Dr. Jan Kober
Institute of Thermomechanics,
Prague, Czech Republic

Topics:

The short course An Advanced Course on Computational Structural Dynamics covers topics relating to modern and recent numerical methods in computational structural dynamics, finite element method in linear and nonlinear dynamic cases, signal theory, contact problems, modern methods for direct time integration and partitioned analysis, modal and spectral analysis, coupled problems (e.g. fluid-structure interaction, vibro-acoustic), reduced modelling in dynamics, structural system identification, uncertainty quantification, data-driven modelling and machine/deep learning, experiments in dynamics and many others. The depth focus is paid at the implementation aspects of presented methods and approaches.

The short course is organized under

European Community on Computational Methods in Applied Sciences (ECCOMAS)
Central European Association for Computational Mechanics (CEACM)

- Czech Society for Mechanics (CSM)
- Czech Academy of Sciences (CAS)
- Institute of Thermomechanics, (IT CAS)
- Centre of Excellence for Nonlinear Dynamic Behaviour of Advanced Materials in Engineering
- Faculty of Civil Engineering, Czech Technical University in Prague (CTU)

Course schedule:

9.00-10.00	Lecture
10.00-10.30	Coffee break
10.30-11:30	Lecture
11.30-13.00	Lunch
13.00-14.00	Lecture
14.00-14.30	Coffee break
14.30-15:30	Lecture
15.30-16.00	Coffee break
16.00-17.00	Lecture

www: **shortcourse2020.it.cas.cz**
e-mail: shortcourse2020@it.cas.cz
contact: Dr. Radek Kolman, mail: kolman@it.cas.cz

Course fee:

150 € for students and Ph.D. students
200 € for post-docs and junior and senior researchers
250 € for industry and private sector

Participant can partly visit PART I and PART II, in this case the fee for PART I (Basic part) is as 3/5 of the full fee and the fee for PART II (Advanced part) is as 2/5 of the full fee.

The short course will be provided via online webinar by the ZOOM application.

Short Course Program:

Basic Course on Computational Dynamics

DAY 1

1. Basics of dynamics and introduction with course motivation
(K.C. Park)

2. Basics of continuum mechanics and constitutive equations
(A. Tkachuk)

3. Dynamics of linear distributed systems
(J. Kruis)

4. FEM in linear dynamics
(J. González)

5. Implementation aspects of linear FEM I
(J. Kopačka)

DAY 2

6. Beam, Plate and Shell models
(P. Krysl)

7. Signal theory
(J. Kober)

8. Advanced FEM
(P. Krysl)

9. Linear and eigen-value solvers
(J. Kruis)

10. Implementation aspects of linear FEM II
(P. Krysl)

DAY 3

11. Dynamics of multibody systems
(A. Tkachuk)

12. Nonlinear continuum mechanics and nonlinear solvers
(A. Popp)

13. Contact problems
(A. Popp)

14. Direct time integration in dynamics
(R. Kolman)

15. Implementation aspects of nonlinear FEM and contact problems
(A. Popp)

Advanced Course on Computational Dynamics

DAY 4

16. Structural System identification
(K.C. Park)

17. Uncertainty quantification in dynamics
(K. C. Park)

18. Model order reduction in dynamics
(M. Isoz)

19. Experiments in structural dynamics
(J. Kober)

20. Implementation aspects of time integration
(J. Kopačka)

DAY 5

21. Partitioned analysis and nonmatching interface methods
(J. González/K. C. Park)

22. Fluid-structural interactions (FSI)
(J. González)

23.Vibro-acoustic problems
(P. Krysl)

24. Data-driven modelling and Machine/deep learning in dynamics
(Tkachuk/Kopačka)

25. Implementation aspects of Partitioned analysis and FSI
(J. González)