

CoMFoS15: Mathematical Analysis of Continuum Mechanics and Industrial Applications

開催時期 2015-11-16 09:25~2015-11-18 16:40

場所 九州大学 西新プラザ

15th International Conference

CoMFoS15: Mathematical Analysis of Continuum Mechanics and Industrial Applications

URL:<https://sites.google.com/site/comfos15/>

※ この研究集会はマス・フォア・インダストリ研究所 共同利用研究の公開プログラムです。

Keywords:

Continuum mechanics, Fracture mechanics, Mathematical modeling, Industrial applications

Aim and Scope:

CoMFoS15 is a three-day international conference on mathematical aspects of continuum mechanics of solids with participants with diverse backgrounds from mathematics, physics, engineering, and industry. The conference consists of various kinds of lectures including special lectures by keynote speakers. We focus on mathematical theory and numerical simulations related to fracture mechanics, elasticity, plasticity, scattering, inverse problems, optimal shape design, etc. These problems play an important role in engineering and industry, and further development of mathematical understanding for them is needed to make possible future applications.

Expected Outcome:

Each lecture is followed by ample discussion time to provide space for an inspiring research debate among the participants on the above topics. We expect the discussion to focus in particular on

- finding new mathematical research directions in continuum mechanics based on the engineering viewpoint and industrial requirements, and
- investigating future engineering and industrial applications inspired by the theoretical results presented by mathematicians and theoretical engineers at the conference.

History of CoMFoS and MACM:

The conference series "CoMFoS" was started in 1995 and then had been organized by the Activity Group of JSIAM "Continuum Mechanics Focusing on Singularities (CoMFoS)" since 2005. The activity group was renamed "Mathematical Aspects of Continuum Mechanics (MACM)" in April 2010. It started as a research community of applied mathematicians and engineers working mainly on solid continuum mechanics and fracture mechanics. At present, it gathers not only mathematicians and engineers but also researchers in physics

and industry who discuss mathematical aspects of continuum mechanics related to wider topics such as

- fracture and damage mechanics,
- elasticity and plasticity,
- optimal shape design,
- scattering and inverse problems,
- visco-elastic materials,
- particle methods,
- free boundary problems, etc.

開催期間 2015年11月16日(月) ~ 11月18日(水)

開催場所 〒814-0002 福岡市早良区西新2-16-23
九州大学 西新プラザ

【プログラム】 (全28講演)

Keynote talks: 60 min (45 min talk + 15 min discussion)

Invited talks: 30 min (20 min talk + 10 min discussion)

11月16日(月)

9:25 - Yasuhide Fukumoto (Director of IMI)

9:30 *Opening address*

9:30 - Mitsuteru Asai (Kyushu University)

10:30 *Multi-scale and -physics particle simulation for tsunami disaster mitigation*

10:30 Yasuhide Fukumoto (Kyushu University)

- *The contribution of Kawada to the analytical solution for the velocity*

11:00 *induced by a helical vortex filament and modern applications of helical vortices*

11:00

- Coffee Break

11:10

11:10 Kentaro Emoto (Tohoku University)

- *Synthesis of seismic wave envelopes based on the Markov approximation*

12:10

12:10 Shiro Hirano (Ritsumeikan University)

- *Propagation velocity of pulse-like rupture along earthquake fault*

12:40

12:40

- Lunch Break

14:00

14:00 Josef Málek (Charles University)

- *On elastic solids with limiting small strain: modelling and analysis I*

15:00

15:00 Takeshi Takaishi (Hiroshima Kokusai Gakuin University)

- *Applications of the phasefield crack growth model*

15:30

15:30 Hirotada Honda (NTT Network Technology Laboratories)

- *Mathematical analysis of synchronization from the perspective of network science*

16:00

16:00 Coffee Break
-
16:10
16:10 Akira Takada (Asahi Glass Co., Ltd.)
- *Mathematical modeling of glass materials*
17:10 Takeshi Aoyagi (Asahi Kasei Corporation)
- *Computer simulation of phase separation of polymeric materials for*
18:10 *industrial applications*
19:00 Banquet 1
-

11月17日(火)

9:30 - Victor A. Kovtunenکو (University of Graz)
10:30 *High-order topological expansions for forward and inverse Helmholtz problems I*
10:30 Yoshimi Tanaka (Yokohama National University)
- *Fracture and adhesive energy of soft materials*
11:00
11:00
- Coffee Break
11:10
11:10 Masanori Kikuchi (Tokyo University of Science)
- *Numerical simulation of Fatigue Fracture and Ductile Fracture Processes using FEMA*
12:10
12:10 Patrick J.P. van Meurs (Kanazawa University)
- *Bridging the scales between discrete and continuum dislocation models*
12:40
12:40
- Lunch Break
14:00
14:00 Josef Málek (Charles University)
- *On elastic solids with limiting small strain: modelling and analysis II*
15:00
15:00 Takanori Ide (AISIN AW Co.,Ltd.)
- *Highly parallel computation of eigenvalue analysis in acoustic problem for automatic transmission of vehicles using Sakurai-Sugiura method*
16:00
16:00
- Coffee Break
16:10
16:10 Yikan Liu (The University of Tokyo)
- *Hyperbolic-type equations and the related inverse problems for the time cone model*
16:40
16:40 Katsuhiko Sato (Hokkaido University)
- *Why does shear banding behave like first-order phase transitions?*
17:10 *Derivation of a potential from a mechanical constitutive model*

- 17:10 Thomas G. de Jong (Eindhoven University of Technology)
 - *Modelling fungal hyphae growth: Searching for travelling waves in an extension of the thin viscous sheet equations*
- 17:40 Hisasi Tani (Meiji University)
 - *On Boundary Conditions for Hele-Shaw Problem*
- 18:10
- 19:00 Banquet 2
 -

11月18日(水)

- 9:30 - Hideyuki Azegami (Nagoya University)
 10:30 *Solution of shape optimization program and its application to product design*
- 10:30 - Kohji Ohtsuka (Hiroshima Kokusai Gakuin University)
 11:00 *Shape optimization by GJ-integral: Localization method for composite material*
- 11:00 - Coffee Break
 11:10
- 11:10 - Tadayoshi Matsumori (TOYOTA Central R&D Labs., Inc.)
 11:40 *PDE based filtering techniques for shape optimization*
- 11:40 - Victor A. Kovtunencko (University of Graz)
 12:40 *High-order topological expansions for forward and inverse Helmholtz problems II*
- 12:40 - Lunch Break
 14:00
- 14:00 - Masato Kimura (Kanazawa University)
 14:30 *Shape optimization approach by traction method to an inverse free boundary problem*
- 14:30 - Vladimír Chalupecký (Fujitsu Ltd.)
 15:00 *Multi-scale simulations of heart electrophysiology and mechanics*
- 15:00 - Hirofumi Notsu (Waseda University)
 15:30 *Error estimates of a stabilized Lagrange-Galerkin scheme for an Oseen-type diffusive Peterlin model*
- 15:30 - Daisuke Tagami (Kyushu University)
 16:00 *Some investigations into finite element methods for viscoelastic flow problems governed by Oldroyd-B models*
- 16:00 - Hiromichi Itou (Tokyo University of Science)
 16:30 *On singularities in 2D linearized elasticity*
- 16:30 - Closing
 16:40

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 Daisuke Tagami (Kyushu University)
 Akira Takada (Asahi Glass Co., Ltd.)

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