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A One-day International Workshop (online) on Material and Geometric Nonlinearity Modeling for Geotechnical Applications

Organized by
School of Civil and Environmental Engineering
Indian Institute of Technology Mandi

Date: December 10, 2022 (9:00 AM – 5:00 PM)

This workshop is a part of the Scientific Social Responsibility under Early Career Research Award, SERB, New Delhi.



About the Institute: IIT Mandi

Nestled in the Shivalik Range of the Himalayas, away from the hustle and bustle of metropolis, a new abode of learning has germinated. IIT Mandi has been established with the vision to be a leader in science and technology education, knowledge creation and innovation, in an India marching towards a sustainable society. The institute has 9 academic sections including School of Civil and Environmental Engineering, the workshop organizing school.

About the School:

The School of Civil and Environmental Engineering has been newly formed in July, 2022 and comprises of various disciplines such as Geotechnical, Structural, Water Resources and Environmental Engineering. Earlier, it was part of the School of Engineering consisting of Material science, Mechanical and Civil Engineering.

About the Workshop

Consideration of nonlinear behavior of geomaterials is an imperative aspect for effective design and numerical modeling of complex geotechnical structures. Such nonlinearity is primarily attributed by the granular nature of the particulate assembly and the multi-phase material structure further aids to it. In addition to the material nonlinearity, geometric nonlinearity is another important aspect to be addressed while modeling large deformation phenomena like landslide induced debris flow, pile or cone penetration, ground deformation under blast loading and projectile penetration etc. to name a few. Unlike the conventional geotechnical designs based on simplified material response, numerical modeling of such complex boundary value problems requires special attention in reference to both material and geometric nonlinearities. The proposed workshop envisions to deliver a basic understanding related to these modeling aspects through multiple well-structured lecture and hands-on sessions.

Learning Outcomes

The workshop will be primarily addressing

- The genesis of material nonlinearity in geomaterials and different multi-scale modeling approaches to bridge the “grain to continuum” response of these materials.
- Constitutive modeling of pressure-dependent/frictional materials, such as soils, with focus on underlying assumptions and limitations of different material models.
- Total and updated Lagrangian formulations for geometric nonlinearity modeling.
- Numerical modeling of two types of geo-structures employing ABAQUS software tool and involving both material and geometric nonlinearity.

Registration

- Online registration for the course can be completed by using this link: [Registration link](#)
- Registration deadline : 5 PM IST, 9th December, 2022
- There is **no registration fee** for participation in this workshop. However, **registration is mandatory** for all the participants and attendees.
- The program schedule and online link of the workshop will be sent to the registered participant by 9th December, 2022.

Technical Contributors/ Resource Persons

Session 1 (Inaugural Session): Material nonlinearity and multiscale modeling approach for geomaterials



Dr. Giang Nguyen
Associate Professor
School of Civil, Environment and Mining Engineering, The University of Adelaide, Australia

Session 2: Lectures on material/constitutive modeling pertinent to granular materials



Dr. Arghya Das
Associate Professor
Department of Civil Engineering
Indian Institute of Technology Kanpur, India



Dr. Mousumi Mukherjee
Assistant Professor
School of Civil and Environmental Engineering
Indian Institute of Technology Mandi, India

Session 3: Lecture on geometric nonlinearity modeling



Dr. Amar Nath Roy Chowdhury
Assistant Professor
Department of Civil Engineering
Indian Institute of Technology Kanpur, India

Session 4: Demonstration on numerical modeling of geo-structures employing ABAQUS



Mr. Siddharth Pathak
Doctoral research scholar
School of Civil and Environmental Engineering
Indian Institute of Technology Mandi, India

Contact Details of the Organizers

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