

第6回レジリエンス工学国際セミナー 6th International Seminar on Resilience Engineering

主催：レジリエンス工学研究センター Hosted by: Resilience Engineering Research Center

トピックス: Topics

マルチスケール・マルチフィジックスシミュレーション
Multiscale and Multiphysics Simulation

日時: Date

2019/3/27 13:00 ~ 15:00

場所: Venue

工学部 8号館 222室
Room-222, Faculty of Engineering Building 8

プログラム: Program

Development of Dilated Polyhedral DEM and its Application in ice load determination on ship hull
Prof. Shunying Ji (Dalian University of Technology, China)

Abstract:

A bond and fracture model is developed to simulate the fracture and fragmentation with an explicit algorithm in the dilated polyhedral discrete element method (DP-DEM) in this study. The Hertzian model is adopted in the contact model between the dilated polyhedral elements which is generated with the Minkowski sum theory. In the bond model, the bond points are initialized on the corresponding bond face of the interface between elements. The strain between two bonded points is calculated by the division of the distance of these two bonded points and the characteristic length, and thus the stress can be determined according to the elastic matrix. The bond force on each bond point is evaluated by stress and average area that every bond point represents on the bond face. The dynamic relaxation approach is employed to establish an explicit integration algorithm. A hybrid fracture model is developed to detect the fracture of the bond point considering the fracture energy and the unified damage. The interaction between sea ice cover and ship hull is simulated to determine the ice load on the ship with this method.



Process modelling of reacting flows and industry applications
Prof. Yansong Shen (University of New South Wales, Australia)

Abstract:

Process design and control plays a significant role in modern industries. Most processes and reactors are very complex, as they usually involve not only multiphase flows but also heat and mass transfers related to chemical reactions and their interactions. The operation must be optimized in order to be competitive and sustainable, particularly under the more and more demanding economic and environmental conditions. This will need continuous innovative research and development. Computer simulation and modelling, supported by experiments, has emerged as an indispensable adjunct to the traditional modes of investigation for design, control and optimization of processes, reactors, and devices. In this presentation, Dr Shen will report his core research on process modelling and design of reacting flows and the applications to a range of complex processes and reactors in conventional and emerging industries. Several examples of industry applications will be used for demonstration, including process metallurgy, coal preparation and utilization. The modelling works are indeed helpful to understand fundamentals and optimize & develop new, cleaner and more efficient technologies with measurable industrial outcomes.



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参加希望者は 3/26 までにご連絡ください。

Please register by March 26th via e-mail.