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Fundamentals of Collision and Constraint Dynamics: Review and Potential Applications in Ocean Engineering

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3:30 pm - 4:30 pm Seminar

Zoom Meeting ID: 935 9608 7383
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Abstract

Hydrodynamic impacts and interactions between fluid flow and solid objects--both moving and stationary--are of great importance in various engineering disciplines from nano- to ocean-scale phenomena. These processes include aggregate/aggregation dynamics of sub-micron particles (as point masses), granular dynamics (as inelastic bodies of finite volumes) for pharmaceutical manufacturing processes and sediment transport in ocean engineering, and classical dynamics of rigid bodies as big as vehicles and shipping containers. Although the collision and constraint dynamics applications have vast length-scale ranges, the principles and fundamentals are equivalent, as developed in classical theoretical physics. Collision dynamics can precisely predict the motion of solid objects in fluid flow, and constraint dynamics can provide a consistent approach to investigate any non-spherical/arbitrary-shaped rigid bodies and flexible bodies (as geometrical collections of poly-dispersed spheres). This presentation covers principles and simulation methods of collision/constraint dynamics and suggests their potential applications in ocean engineering.

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