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ADVANCES IN INTERFACE METHODS AND THEIR APPLICATIONS

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PROPOSAL

Interface problems are omnipresent in science and engineering, including multiphase flows, free surface flows, electromagnetic wave propagation in heterogeneous waves, optical diffusion over different organs, implicit solvent models in structural biology, biological membrane, cell motion, etc. Theoretical modeling of interface problems often involves partial differential equations with discontinuous coefficients and singular sources. Computational techniques, such as the immersed boundary method (IBM), the immersed interface method (IIM), and the match interface and boundary (MIB) method using Cartesian grids, have emerged in the last few decades as suitable candidates for interface computations. Some of the recent technical development emphasizes high order schemes, geometric complexity, stability analysis, geometric singularities, and level set approaches for interface tracking. Many successful applications have been demonstrated in computational flow dynamics, electromagnetic waves, electrostatic analysis of proteins, etc. On the other hand, immersed finite element (IFE) and immersed continuum methods have demonstrated great potentials for a wide range of problems. Focus of this minisymposium will be given on recent advances in numerical and computational methods for interface problems and their application to multiphase flows, electrostatic analysis, electromagnetic waves, biomechanics, cellular mechanics and biomembrane. A broad range of topics in the mathematics and other quantitative aspects of interface problems will be covered in this minisymposium. This event will present an excellent platform for researchers to introduce their recent achievement and to learn about a wide variety of recent developments in computational methods as well as their applications.