

Abstract Submitted
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Comparison study of meshfree methods for viscous flow ZHENYU HE, LOUIS ROSSI, University of Delaware — We compare and contrast two mesh-free schemes for viscous flow: Smoothed particle hydrodynamics (SPH) and vortex methods (VM). SPH and VM are widely used meshfree particle in fluid dynamic applications. SPH is more flexible for capturing multiphysics problems. VM is better developed theoretically but has a more limited scope of applications. In SPH, the state of fluid system is represented by a set of moving basis functions which represent material properties such as density and momentum. Vortex particle methods represent a discretization of the vorticity field and use a Greens kernel to determine the velocity field. Our aim is to clarify the role played by the most commonly used viscous terms in SPH and VM in simulating incompressible fluid flow. Special test problems are used in order to remove the boundary effect to the results. We will present the accuracy and the efficiency of the different schemes which highlight the importance of key parameters in the algorithms including core width, overlap and equations of state.

Zhenyu He
University of Delaware

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