

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Towards a Fully Adaptive Mesh-Free Method for Solving Viscous Incompressible Flows PARITOSH MOKHASI, DIETMAR REMPFER, IIT, Chicago — A fully adaptive mesh-free method based on radial basis functions (RBF) is proposed for numerically solving the Navier-Stokes equations. The scheme is based on the method of lines wherein the spatial derivatives are approximated using a differential quadrature approach. The solution is progressed in time using a fractional step method with pressure correction. To demonstrate its flexibility, the 2D driven cavity problem is solved in the Eulerian and semi-Lagrangian framework using radial basis functions. We further demonstrate, via a 1D spatio-temporal example, that using RBFs adaptively enables one to produce highly accurate results. Finally, we present algorithms for solving a large class of fluid dynamics problems using radial basis functions.

Dietmar Rempfer
IIT, Chicago

Date submitted: 06 Aug 2009

Electronic form version 1.4