Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Accuracy assessment of inverse-distance weighted interpolation in the immersed boundary method YU-HENG TSENG, Lawrence Berkeley National Laboratory, GAO TONG, Department of Modern Mechanics, University of Science and Technology of China — Inverse-distance weighted (IDW) interpolation has been recommended in the immersed boundary method. The interpolation is simple and flexible. However, its accuracy is still not clear yet. We establish a theorem for the error estimation of the IDW interpolation and assess its numerical accuracy on a Cartesian mesh. The accuracy is evaluated and discussed using several analytical functions. Some numerical examples are presented to illustrate the performance and validate the accuracy using a ghost-cell immersed boundary method. These includes flow past a circular cylinder, flow over a sphere, and oceanic flow around an island. These results show significant improvement in terms of the accuracy and stability.

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Date submitted: 03 Aug 2005 Electronic form version 1.4