Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Unstructured Grid Generation via Bubble Packing Method LILONG WU, BIN CHEN, State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, Xi'an, China — Unstructured grid is necessary to numerically simulate the fluid flow in complicated domain. In order to improve the accuracy and efficiency of numerical simulation, a modified physically-based Bubble Packing Method to generate unstructured grid is proposed. In this method the local grid refinement is achieved by adding arbitrary size Bubbles to the real vertices and artificial vertices of the domain. And Shepard interpolation method is used to transfer information from vortices to the inner nodes of the domain, so the mesh density of region can be simply controlled, through which the quality of grid can be improved greatly. At the same time, for the case of curve boundary, the process of initial Bubble and dynamic relaxation is realized by mapping the curve to a straight line and the parameterization of arc-length, which ensures that all edge Bubbles move only on their associated curve. Moreover, the improved BPM is applied to generate unstructured grid with local refinement near the boundary of square domain to simulate the lid-driven flow in a square cavity with Re=1000. The good agreement between numerical result and the benchmark verifies the grid quality and the validation of numerical algorithm on the unstructured grid.

Lilong Wu
State Key Laboratory of Multiphase Flow in Power Engineering,
Xi'an Jiaotong University, Xi'an, China

Date submitted: 23 Jul 2008 Electronic form version 1.4