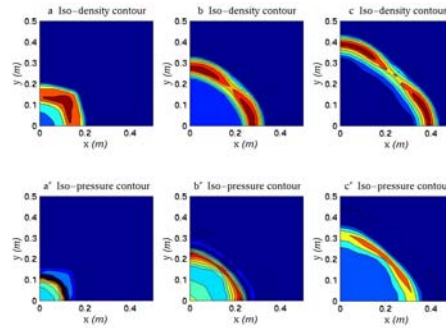


SMOOTHED PARTICLE HYDRODYNAMICS (SPH) AND ITS APPLICATIONS

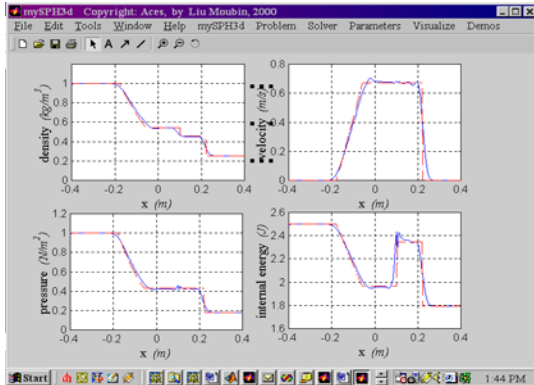
Our Objectives

- Improve the SPH method
- Develop feasible and robust codes
- Promote applications of the methods and codes in engineering

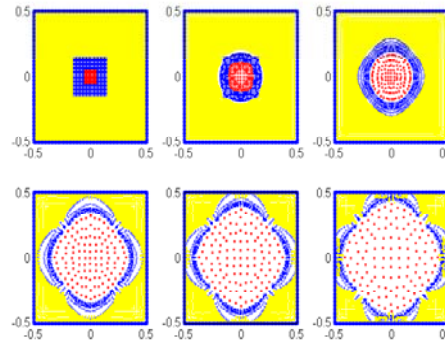
SPH was originally invented for solving astrophysical problems in three dimensions without boundaries. As a meshless, Lagrangian method of particle nature, SPH has some special features over traditional methods such as FDM and FEM. It can treat the large distortions, large inhomogeneities, material interface, moving boundary and free surface fairly well. The aim of this project is to study the SPH methods with focus on the numerical difficulties of boundary conditions so as to develop feasible and robust codes for applications in simulation of general dynamic fluid flow. Attention has also given to some special problems such as underwater explosion. A series of numerical investigations have been conducted, where the simulation results show that SPH is an effective alternative to traditional numerical methods.



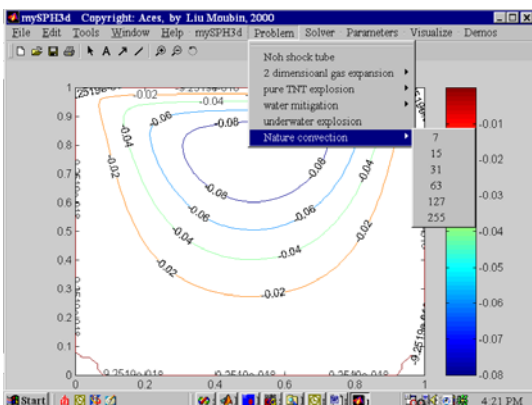
Density and pressure contours for a water mitigation problem



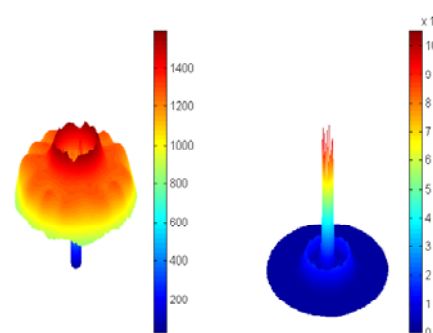
Simulation of Noh tube problem,



Particle distribution in the water



Simulation of the shear driven cavity problem



Density and pressure distribution for