

LARGE EDDY SIMULATION OF PLANE FREE TURBULENT JET AND IMPINGING JET

Maria Algar Ruiz, Spain

Supervisors: C. Benocci & R. Giammanco

In this work Large Eddy Simulation is used to simulate a free turbulent planar jet and a planar impinging jet. Simulation of the velocity field, without scalar transport, were performed for both cases. For the case of the free jet, the Reynolds number used was $Re=6000$. New boundary conditions in the inlet, outlet and upper lower boundary were developed. For the inlet, entrainment boundaries were more suitable to stabilize the free jet. For the upper and lower boundaries, symmetry conditions gave the best results. New convective boundary conditions were also developed. This boundary using a local definition of the convective velocity avoid the pressure waves that causes ingoing flow from the outlet boundary. With all this boundaries a real free jet can be simulated.

For the case of impinging jet three different Reynolds numbers were simulated, $Re=2000$, $Re=6000$ and $Re=10000$. Also two length of slot were tested, 4 and 10. New convective boundary conditions for the upper and lower boundaries were developed to throw the flow from the computational domain. Non-slip wall were used at the left and right boundary. Spite of the difficulties found to simulate the free planar jet the agreement with the experimental data are acceptable. However more work must be done, improving this boundary and developing new ones to obtain better agreement for the turbulent quantities.

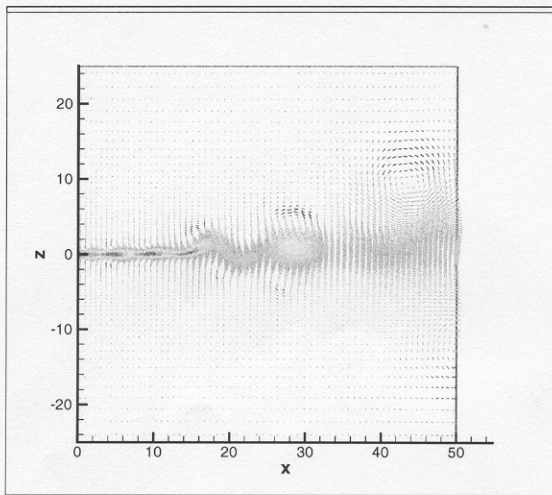


Figure 1: Velocity vectors for free jet

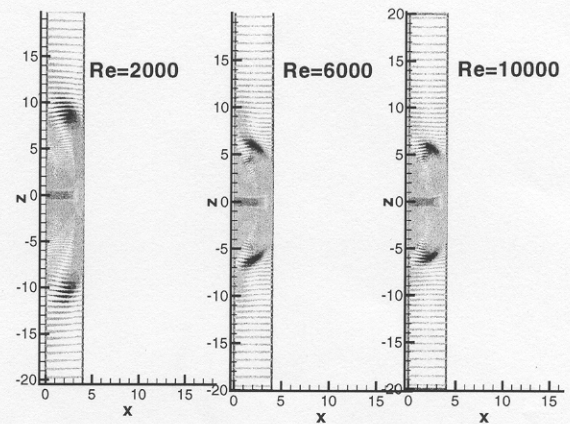


Figure 2: Velocity vectors for impinging jet