Simulation of Lid-Driven Cavity Flow Using the Lattice Boltzmann Method (LBM)

MASTER OF TECHNOLOGY

by

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Results of Lid driven cavity problem by Bounce back Approach:

Reynolds Number: 100

Mach No: 0.05

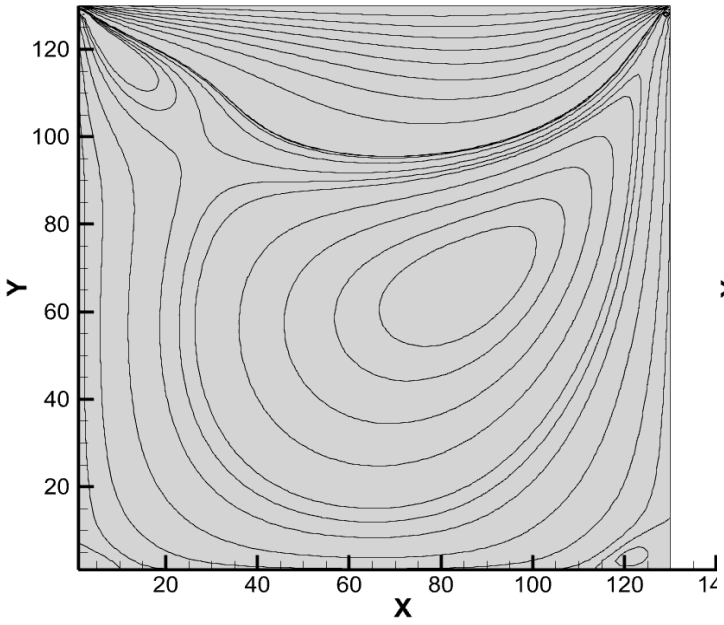

Fig.: Ux velocity variation

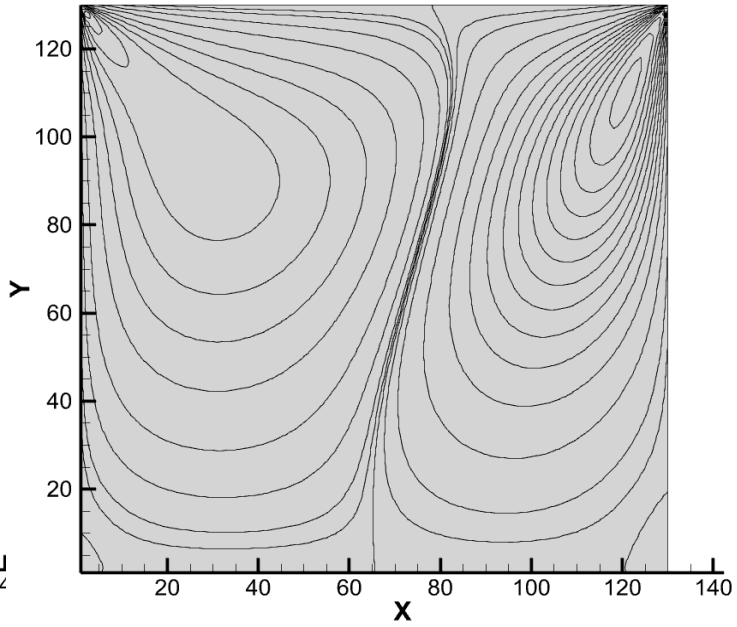

Fig: Uy velocity variation

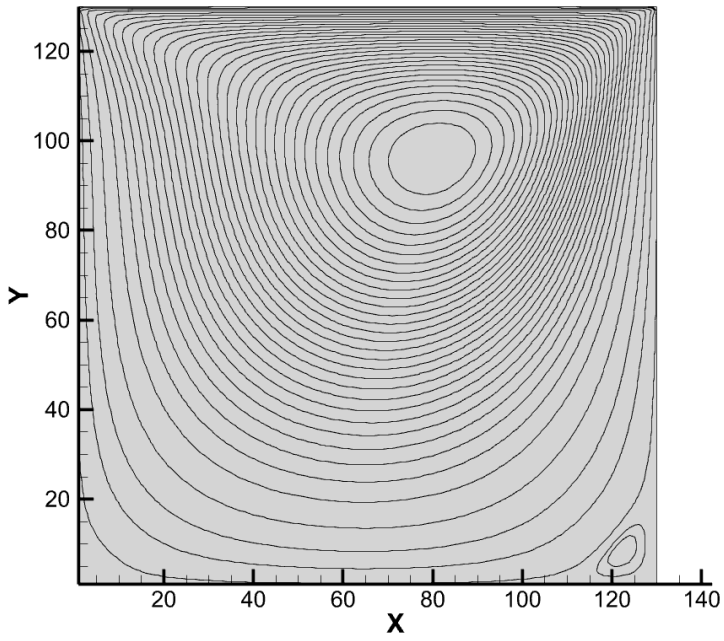

Fig.: Stream function Variation

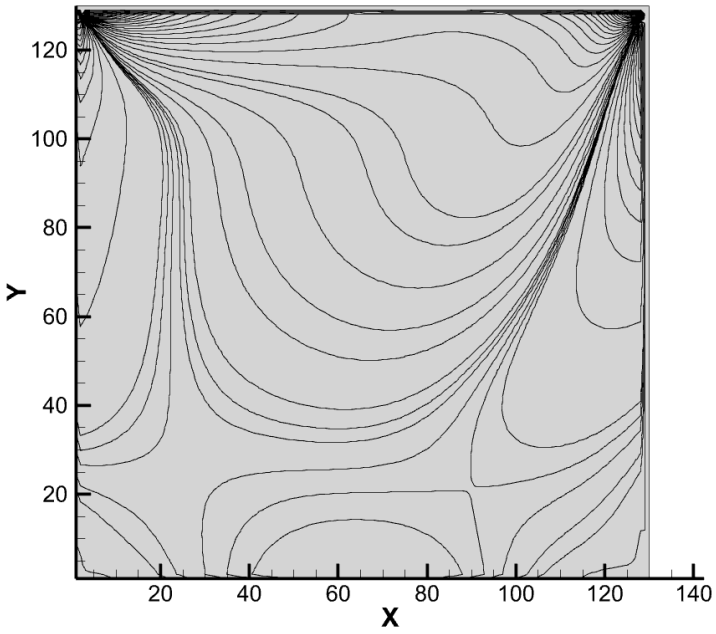

Fig.: vorticity Variation

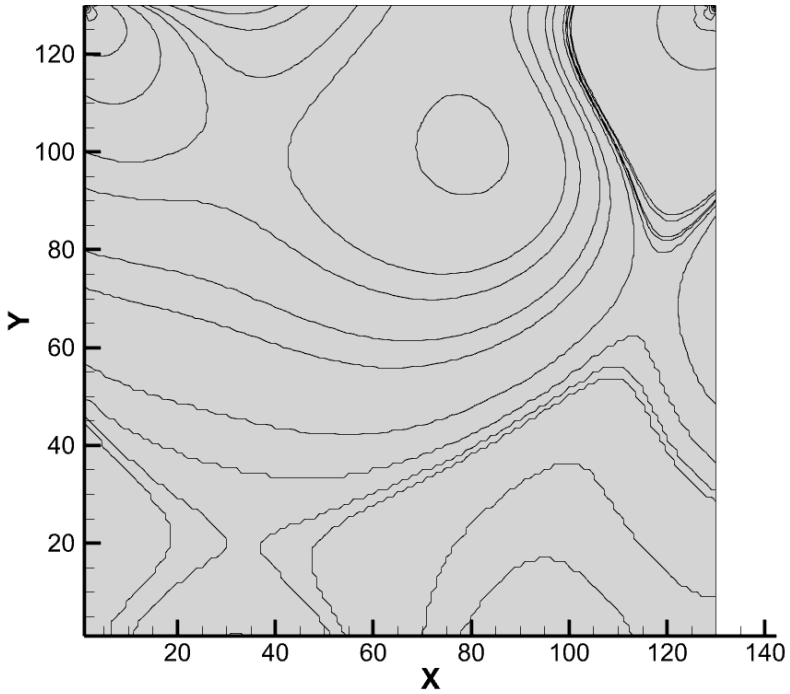

Fig.: Density variation

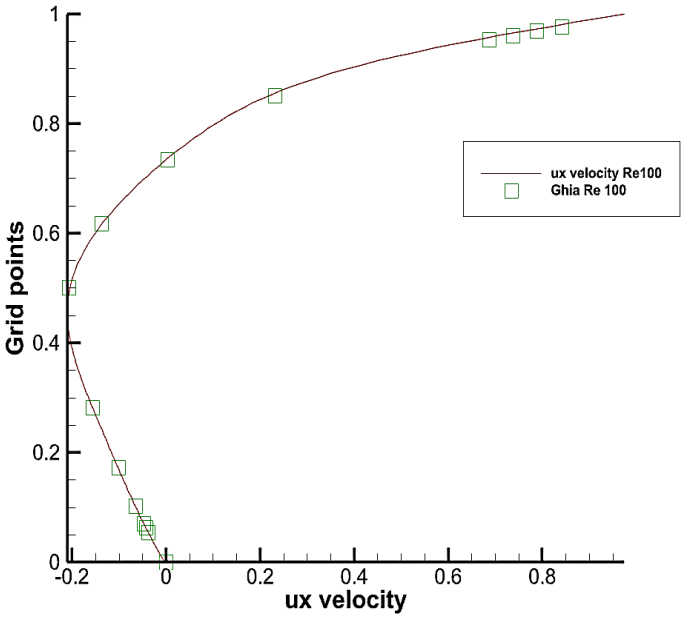

Fig: ux velocity vs grid points

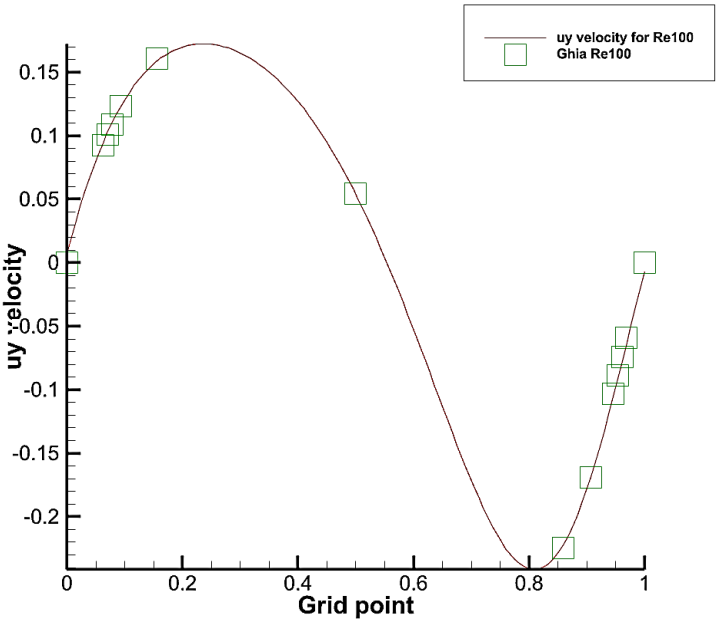

Fig: grid point vs uy velocity

Reynolds Number: 400

Mach no: 0.5

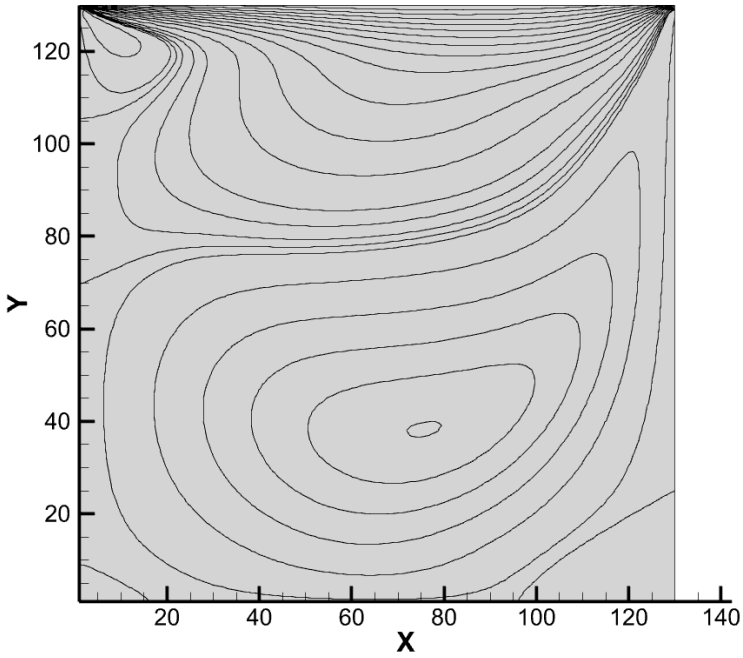

Fig.: Ux velocity variation

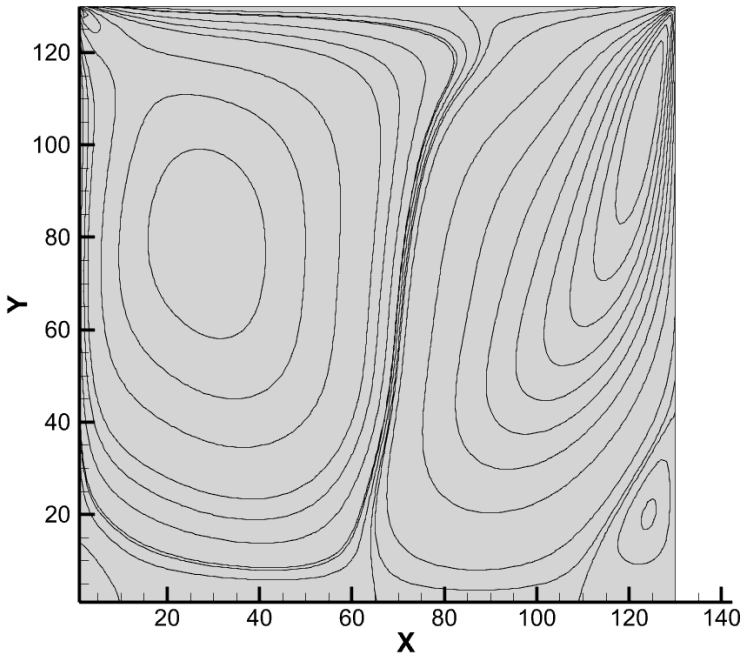

Fig: Uy velocity variation

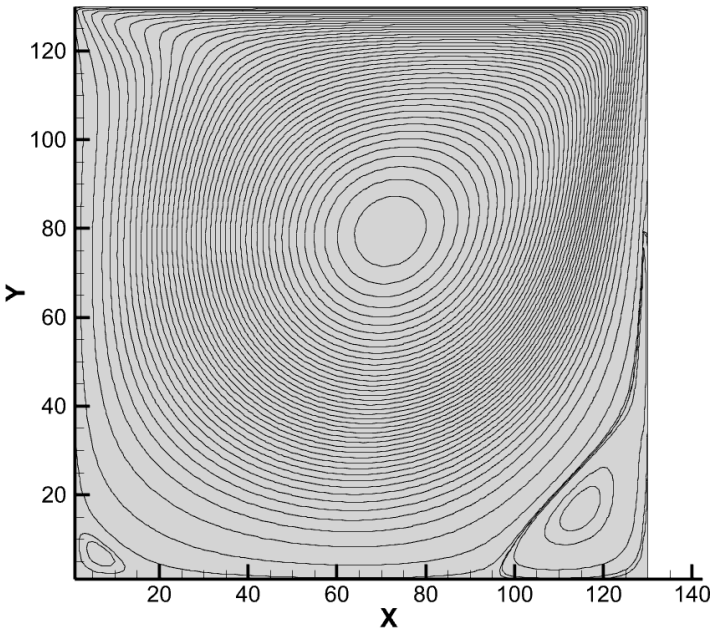

Fig.: Stream function Variation

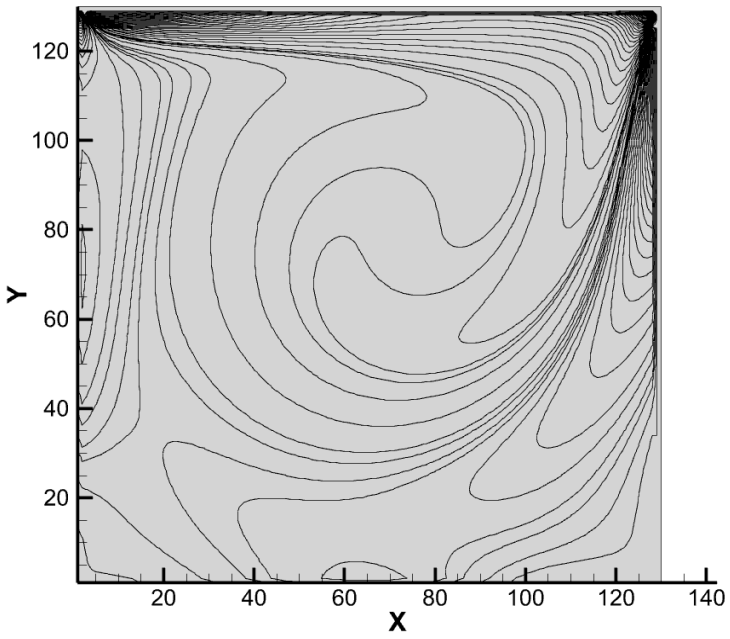

Fig.: vorticity Variation

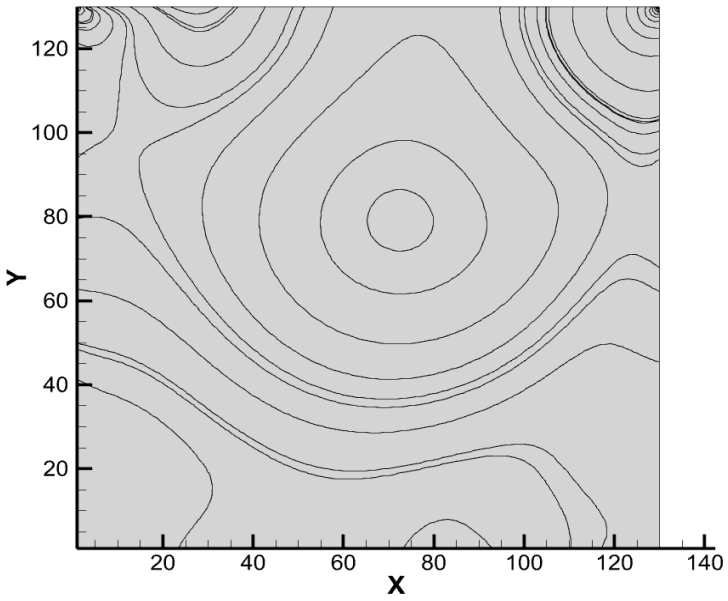

Fig.: Density variation

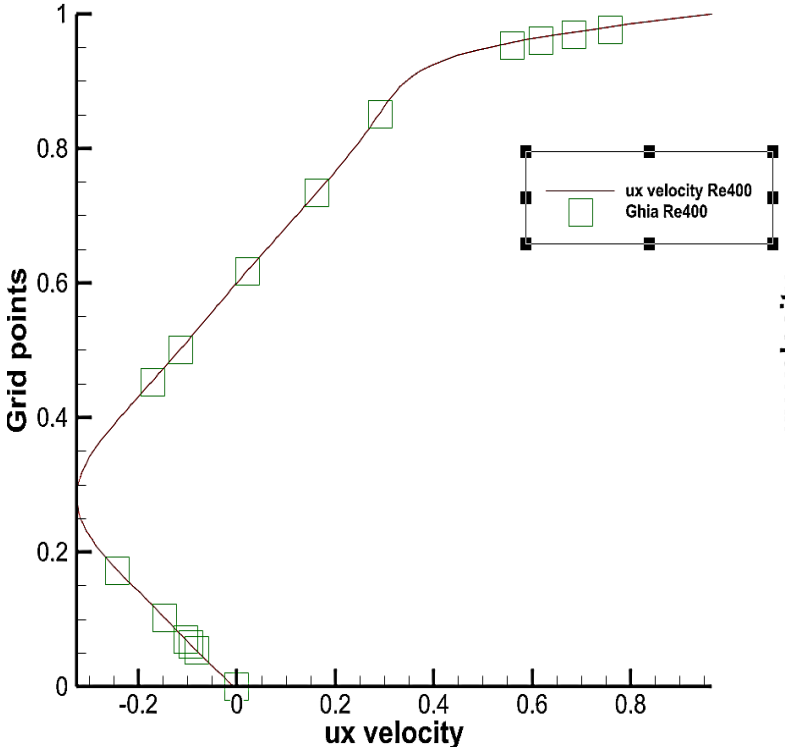

Fig: ux velocity vs grid points

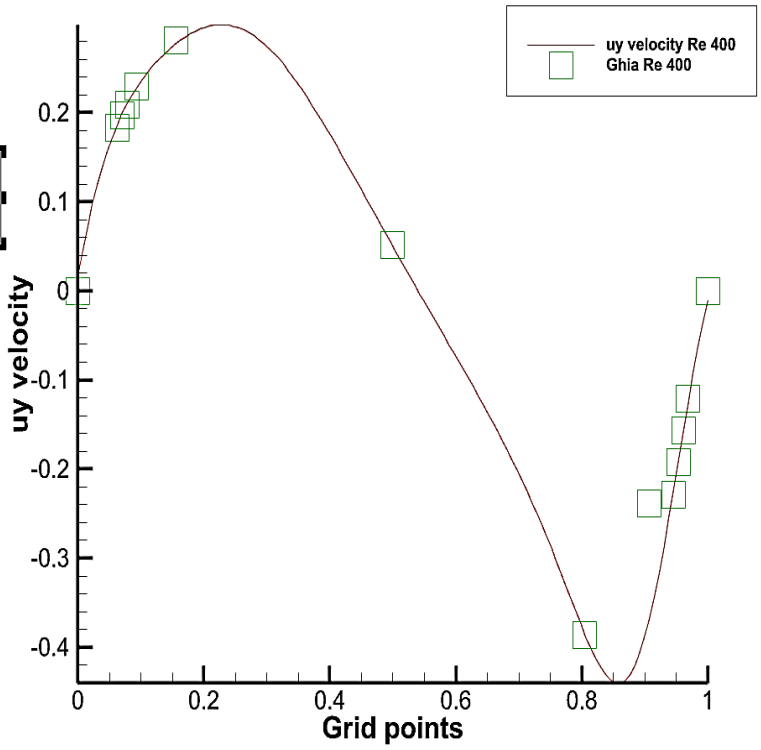

Fig: grid point vs uy velocity

Reynolds Number: 1000

Mach no: 0.6

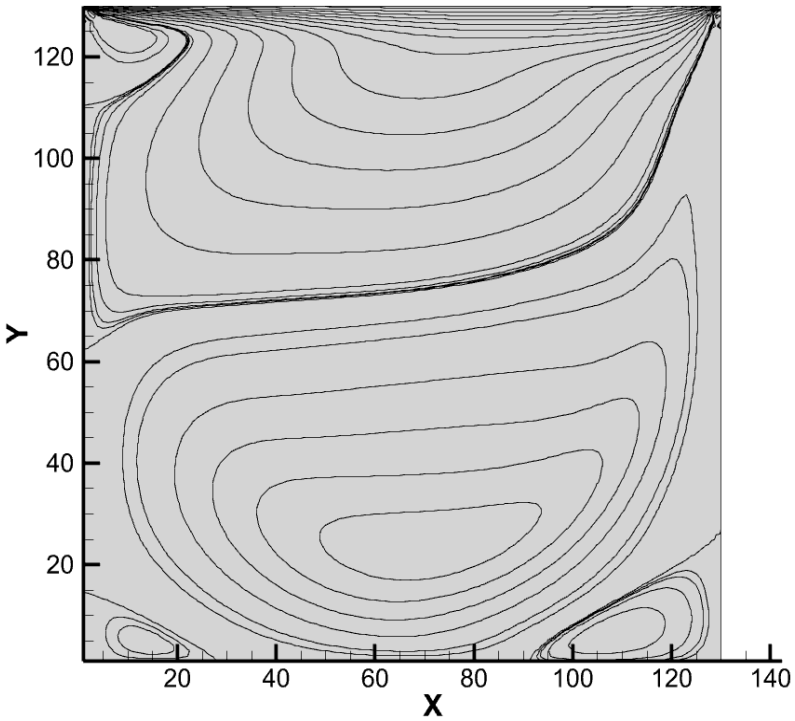

Fig.: Ux velocity variation

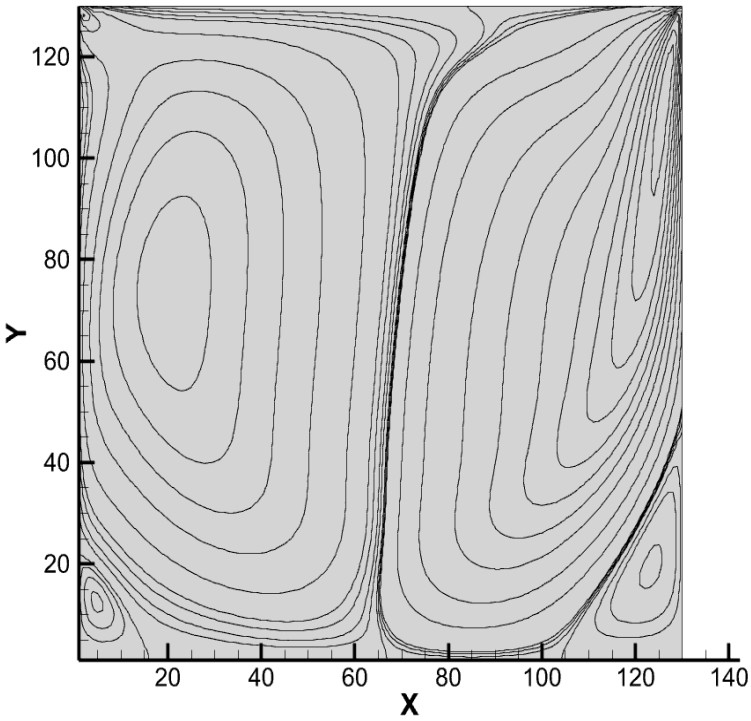

Fig: Uy velocity variation

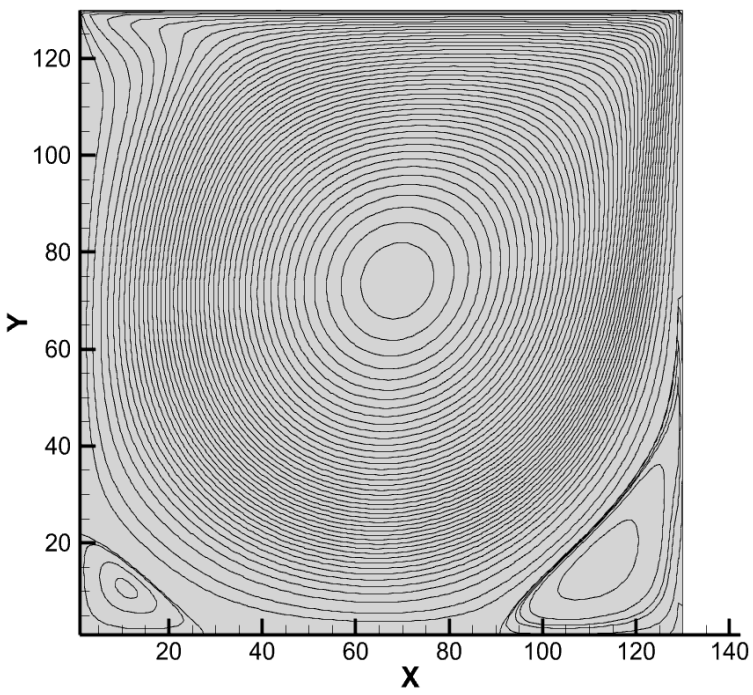

Fig.: Stream function Variation

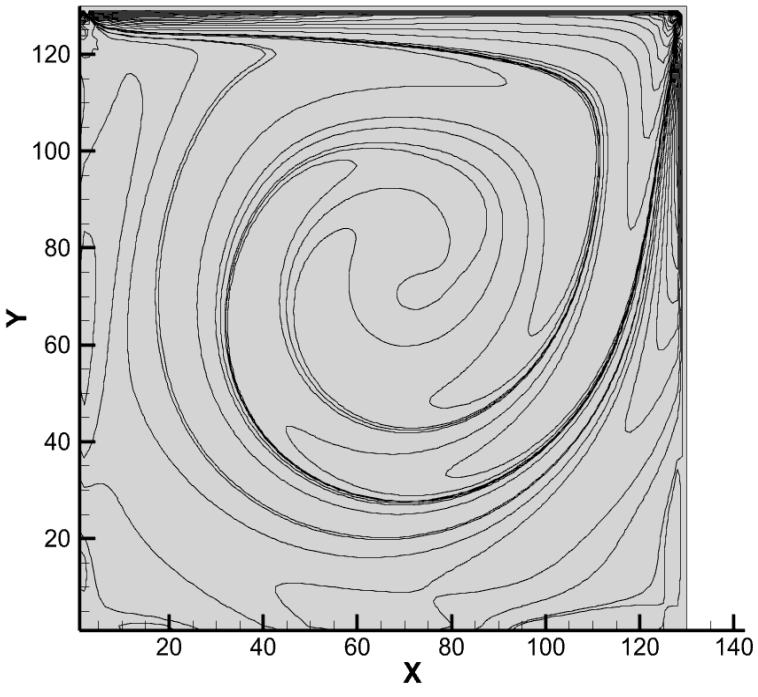

Fig.: vorticity Variation

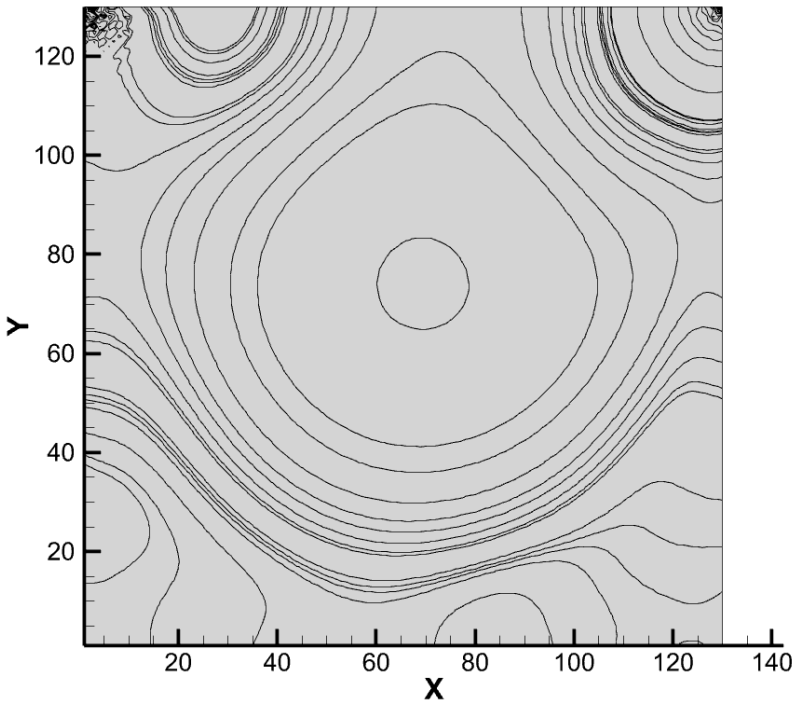

Fig.: Density variation

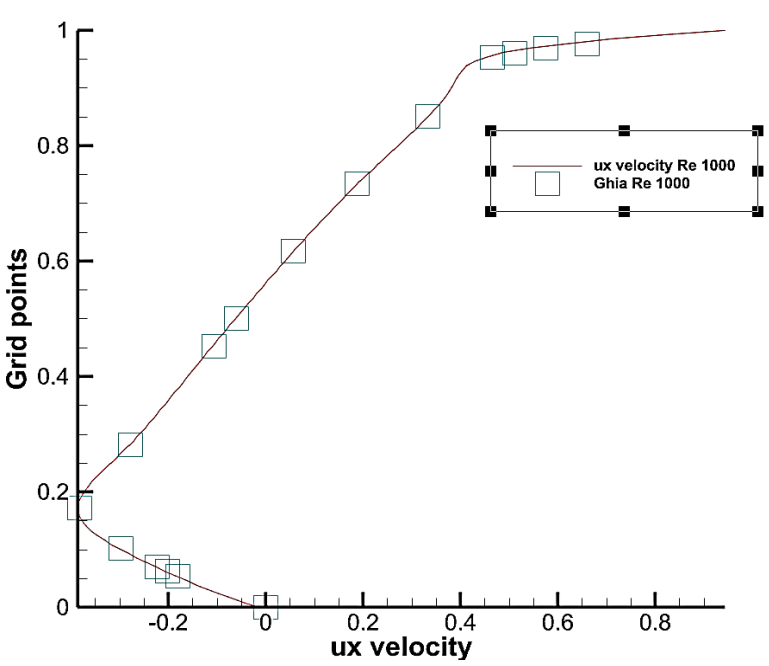

Fig: ux velocity vs grid points

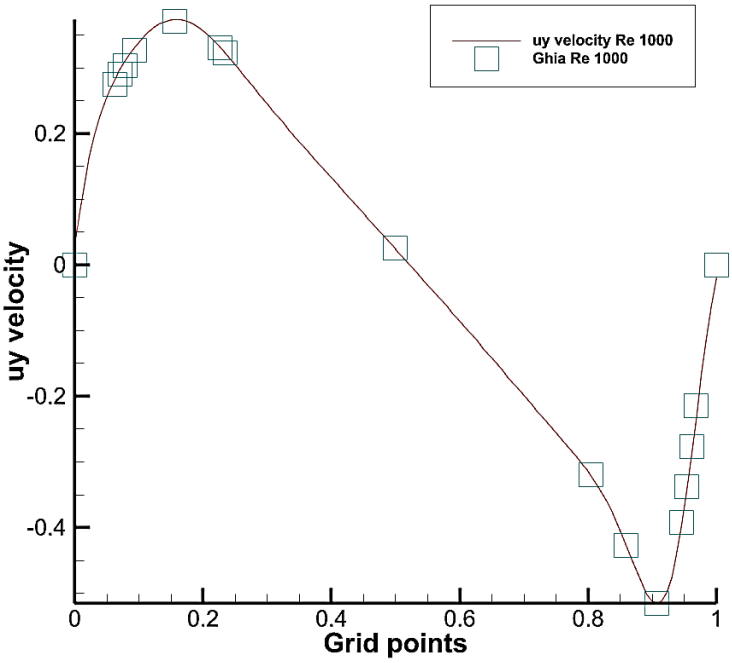

Fig: grid point vs uy velocity

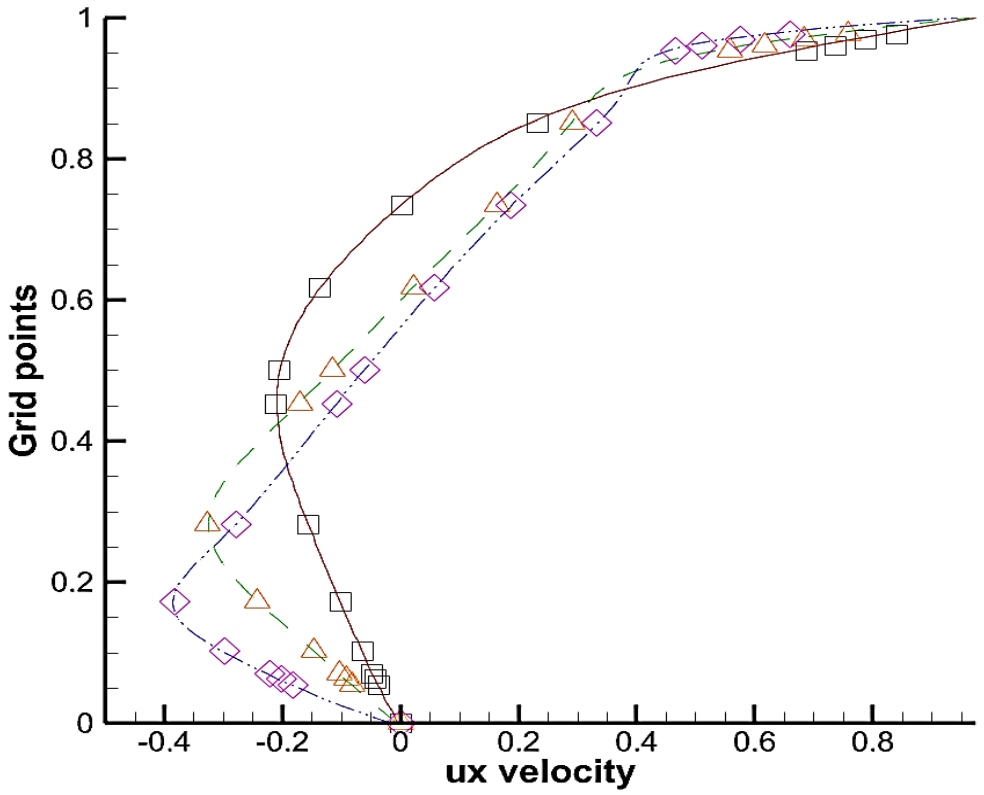

Fig: ux velocity comparison for Re 100, Re 400, Re 1000.

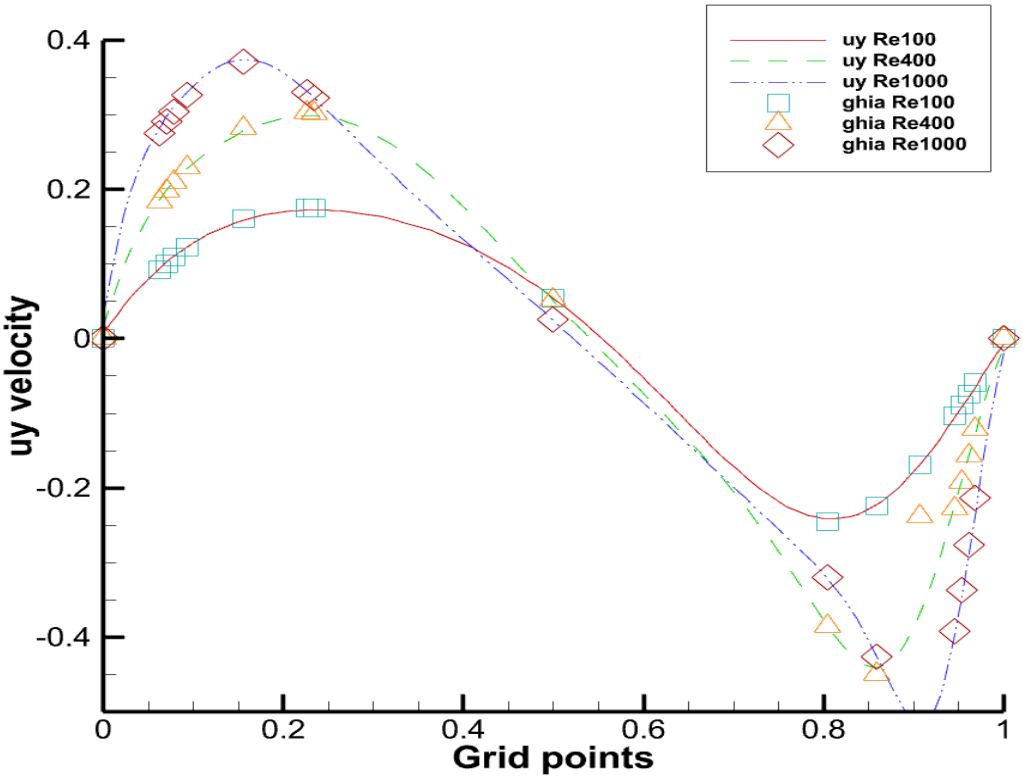

Fig: ux velocity comparison for Re 100, Re 400, Re 1000.

Results using NEBB Methd:

Reynold's Number: 100

Mach Number: 0.05

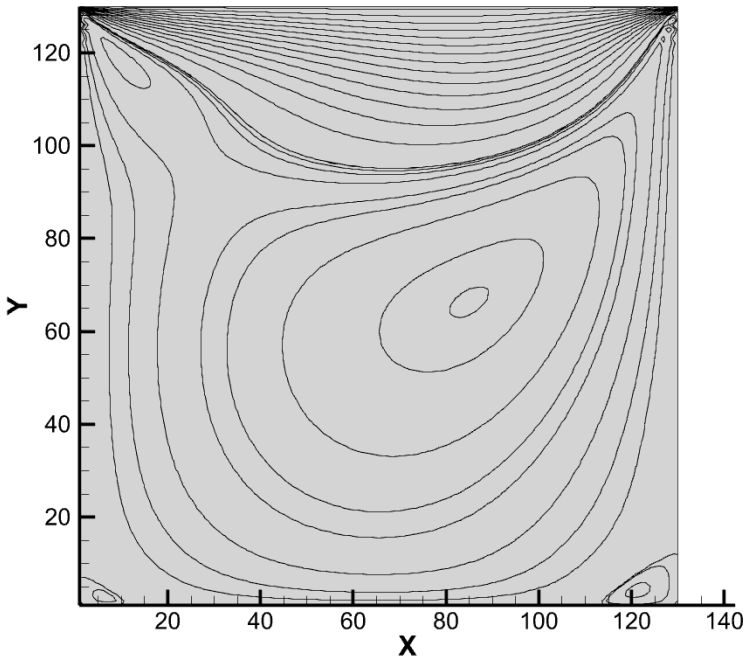

Fig.: Ux velocity variation

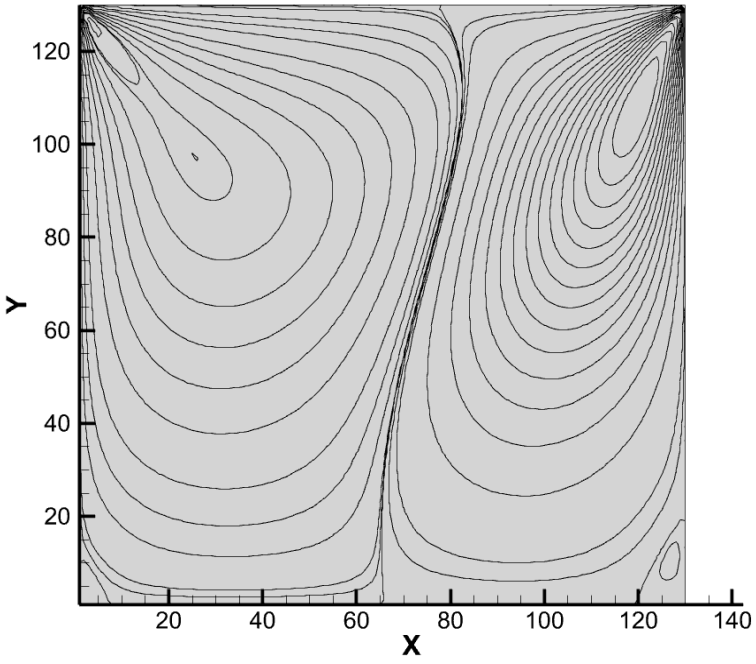

Fig: Uy velocity variation

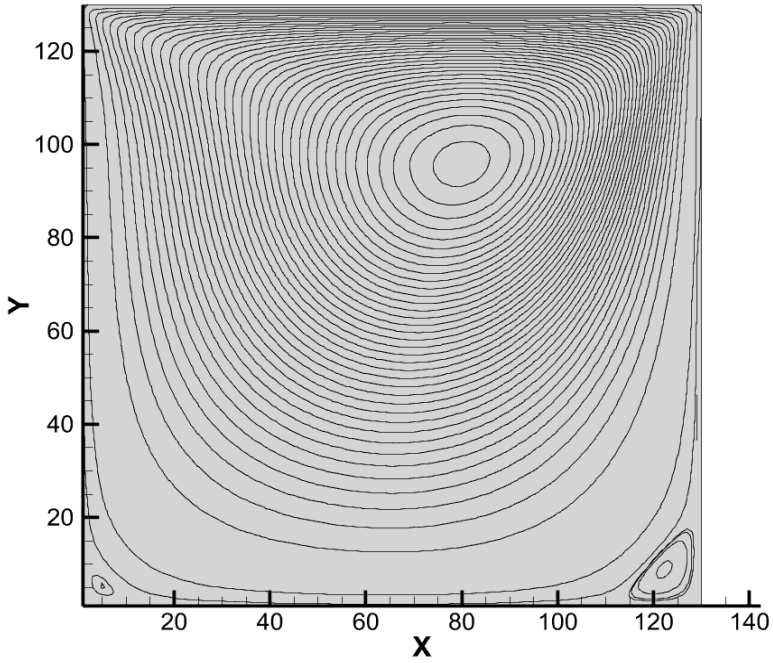

Fig.: Stream function Variation

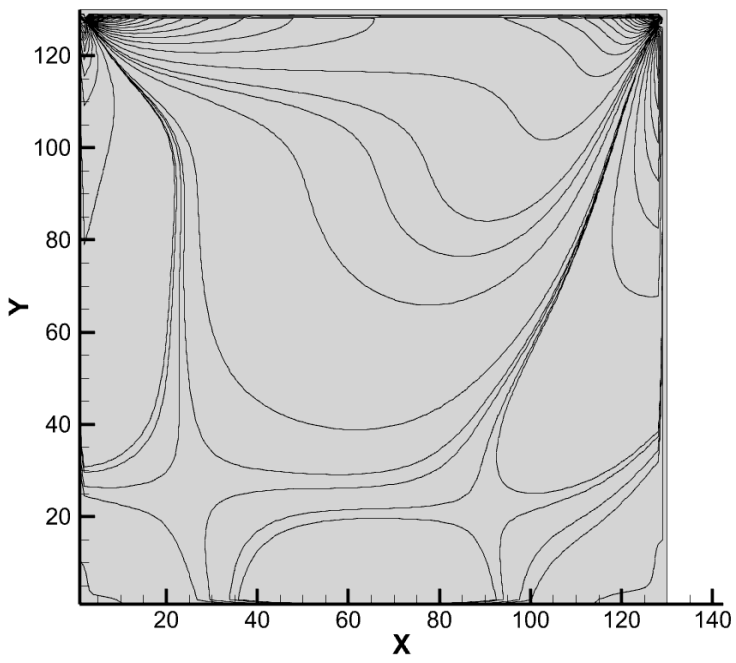

Fig.: vorticity Variation

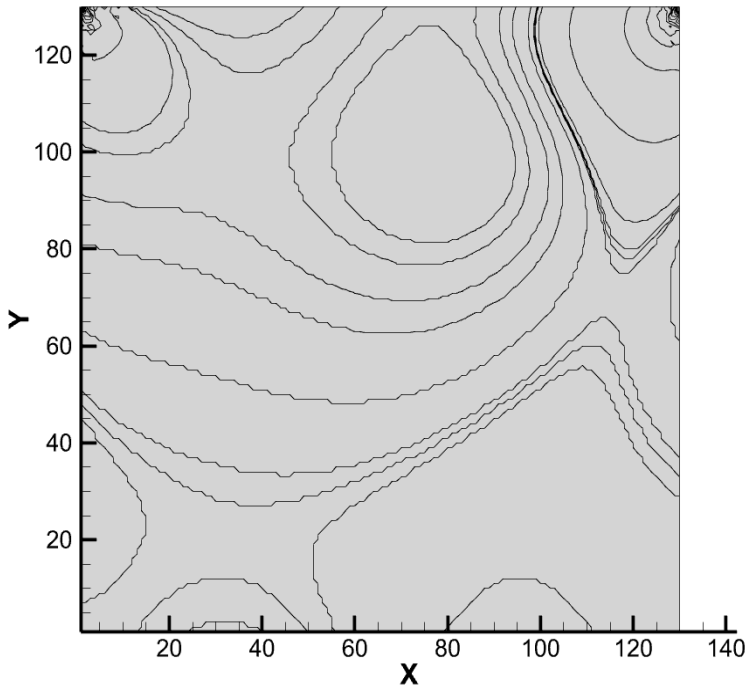

Fig. density variation

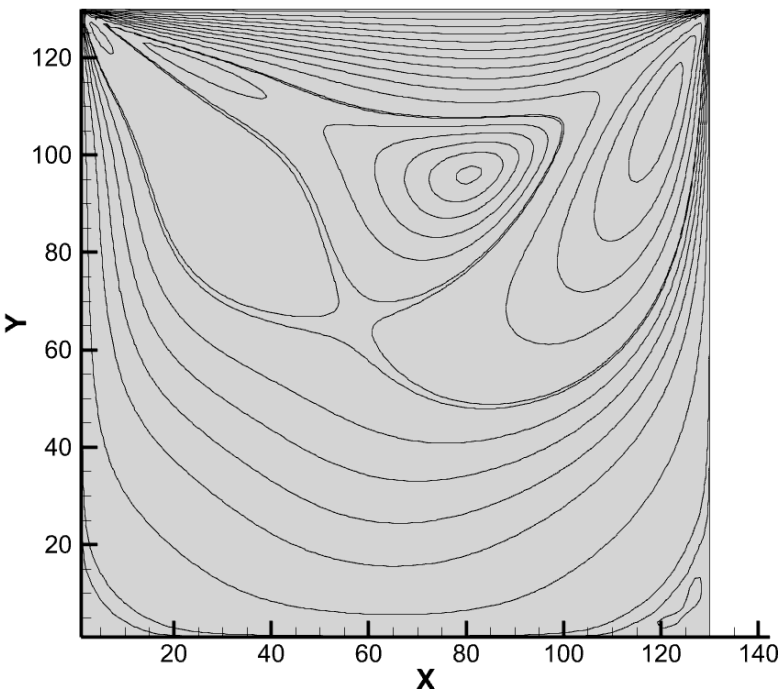

Fig. Pressure variation

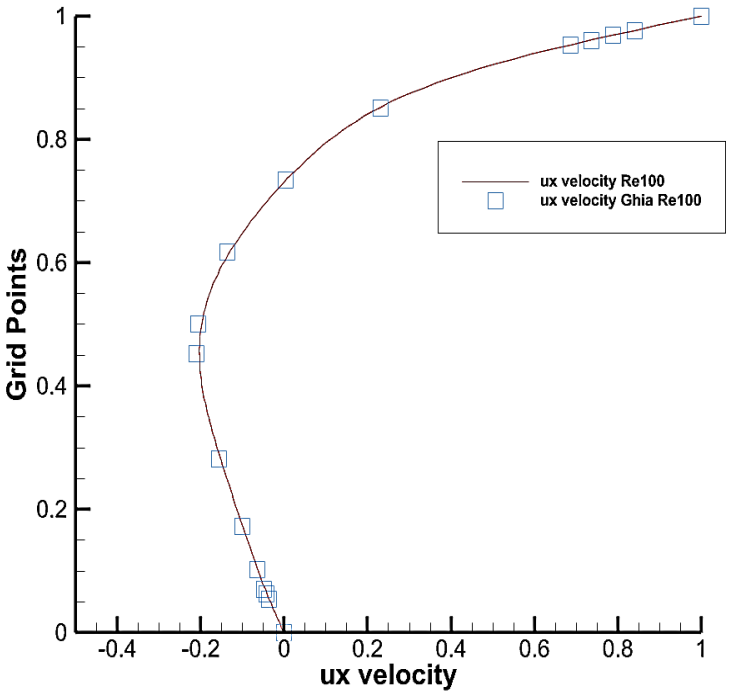

Fig: ux velocity vs grid points

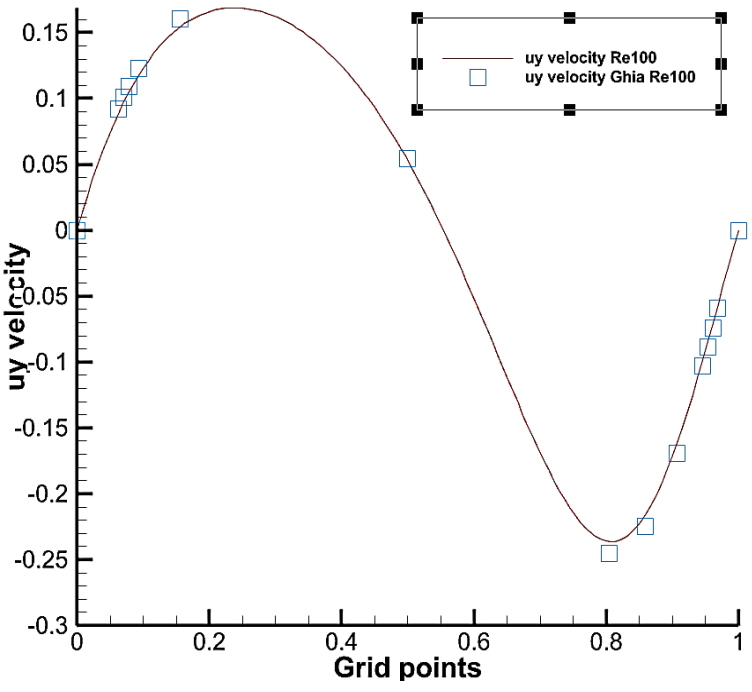

Fig: grid point vs uy velocity

Reynold's Number: 400

Mach Number: 0.5

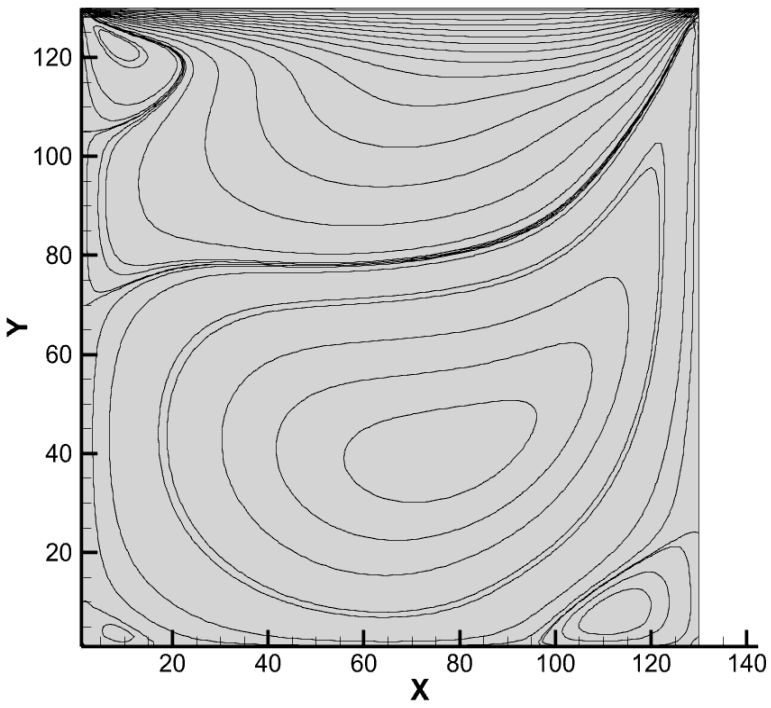

Fig.: Ux velocity variation

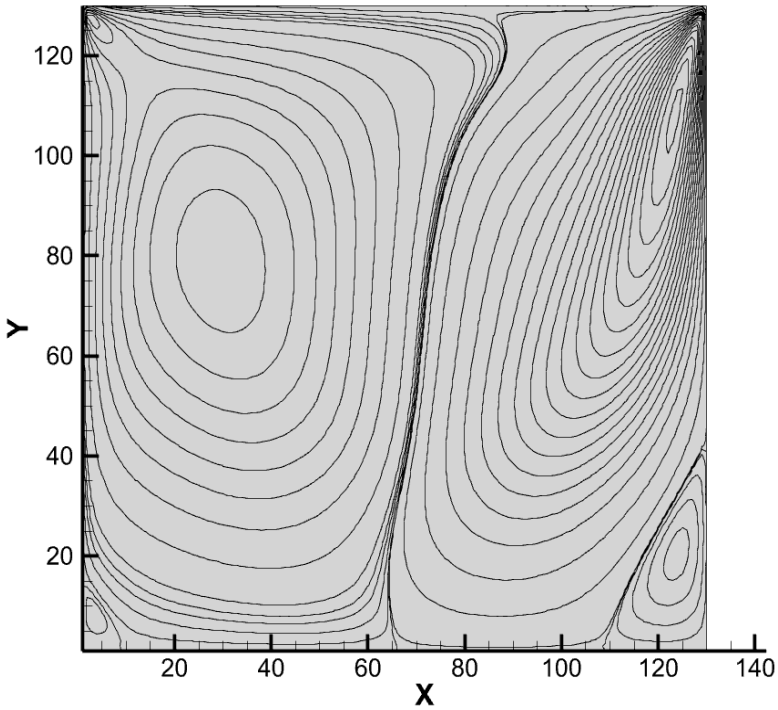

Fig: Uy velocity variation

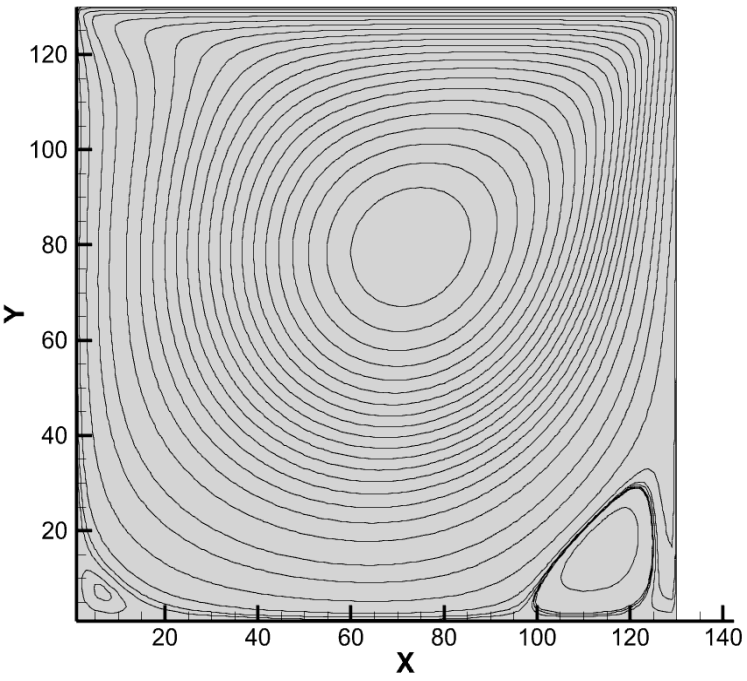

Fig.: Stream function Variation

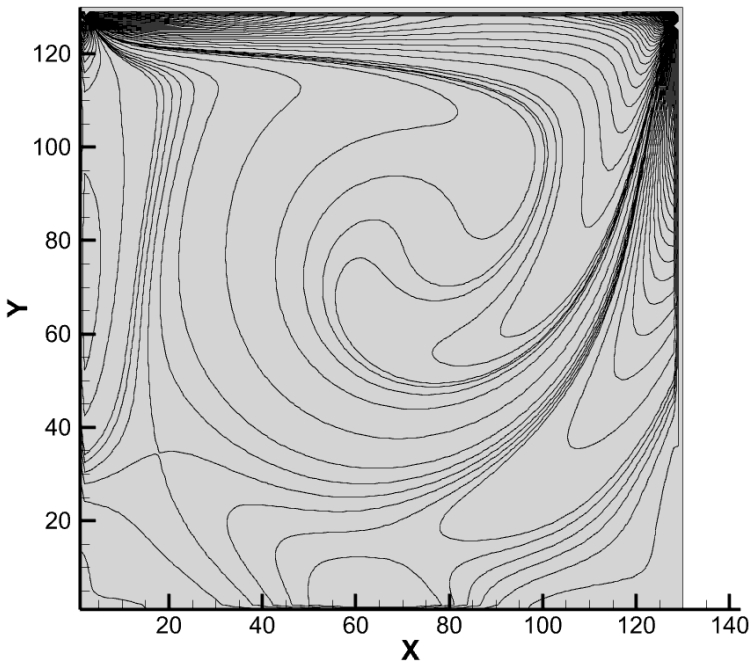

Fig.: vorticity Variation

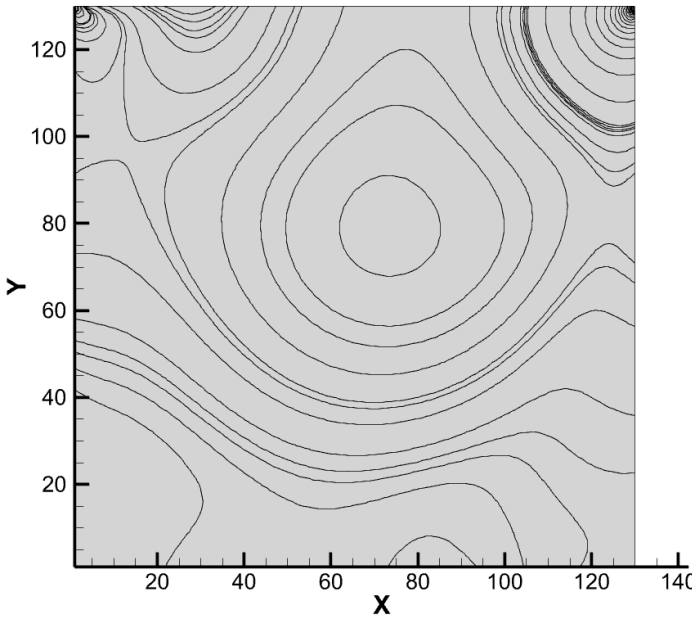

Fig. density variation

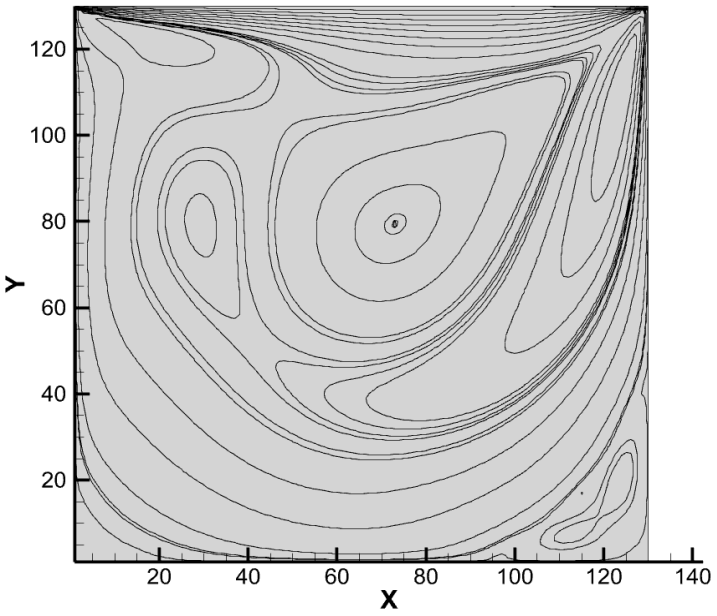

Fig. Pressure variation

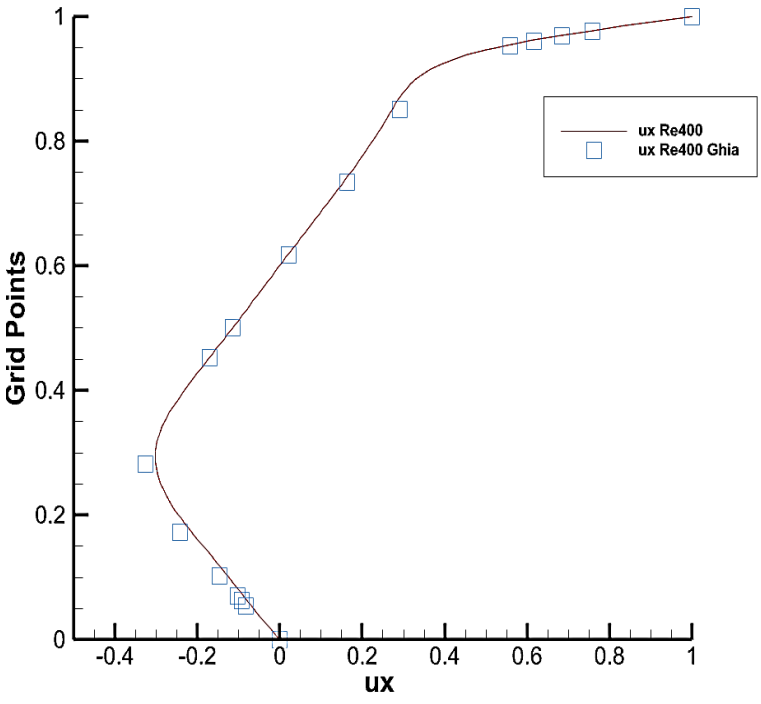

Fig: ux velocity vs grid points

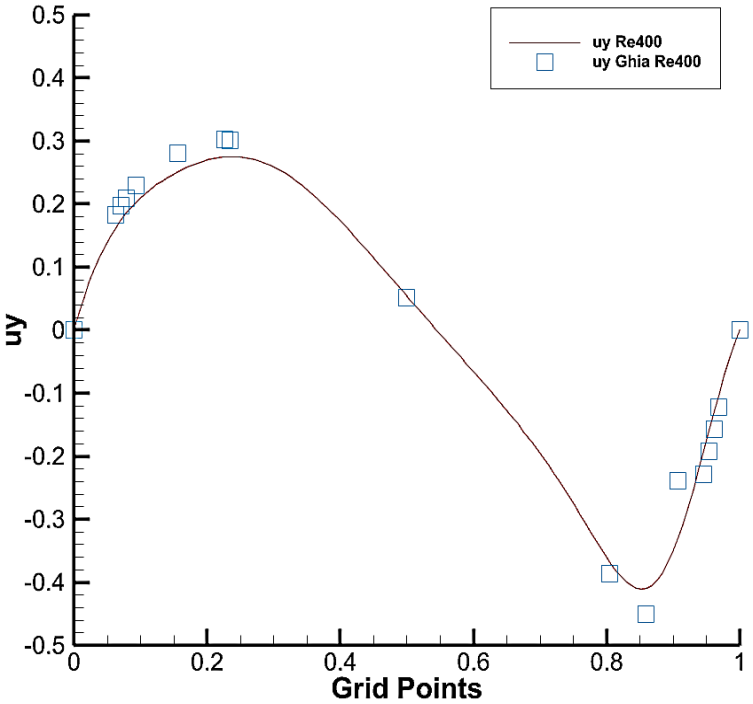

Fig: grid point vs uy velocity

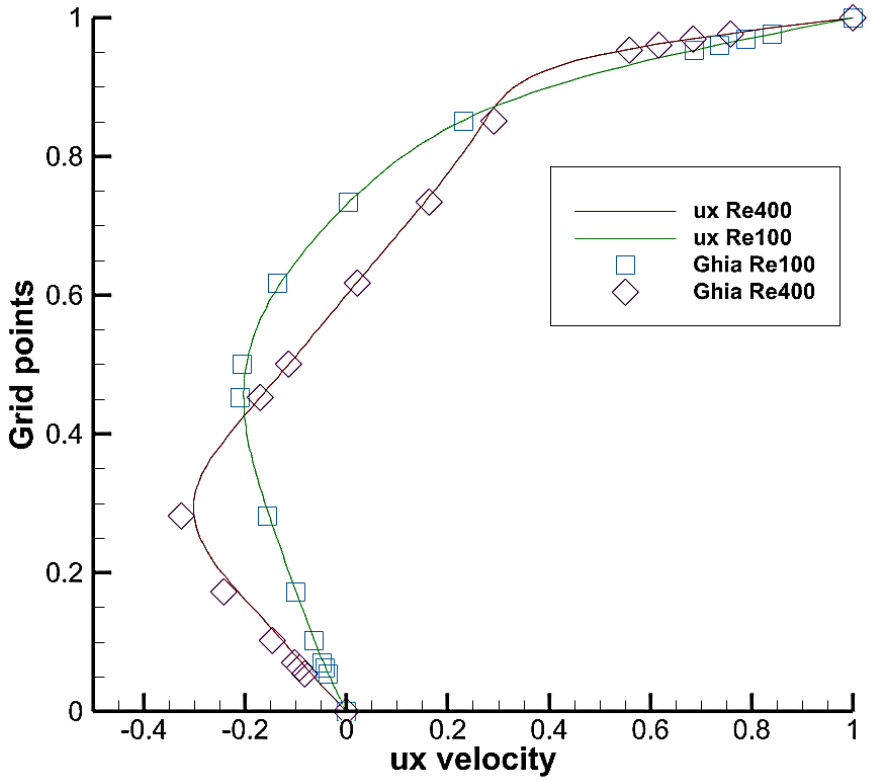

Fig: ux velocity comparison for Re 100, Re 400

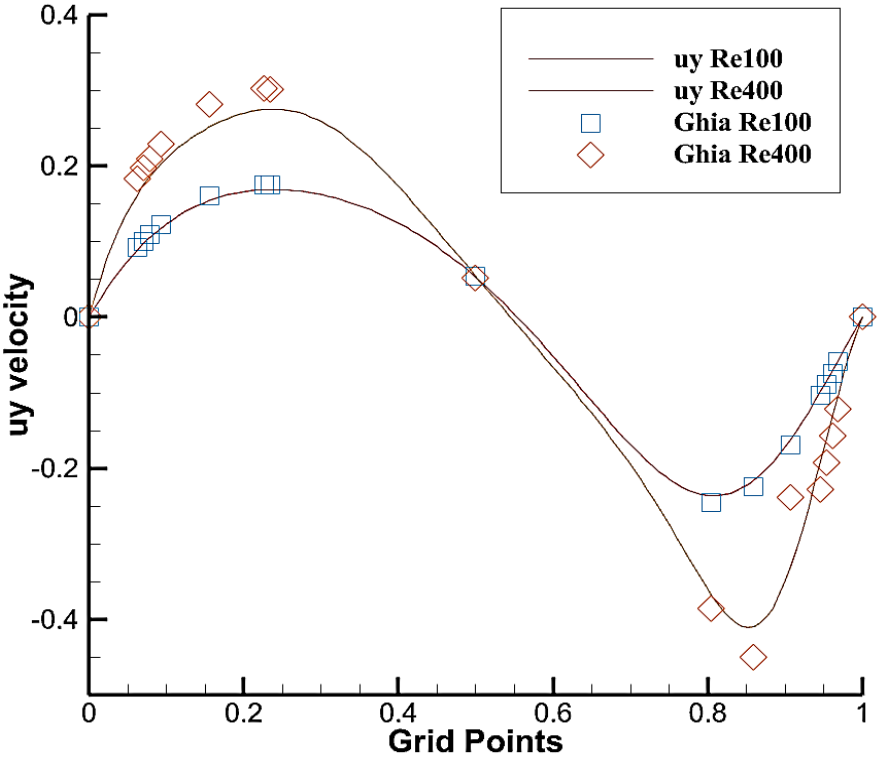

Fig: uy velocity comparison for Re 100, Re 400,