INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
DEPARTMENT OF MECHANICAL ENGINEERING
Guwahati – 781 039, Assam, India

ME 543 Computational Fluid Dynamics
Computer Assignment – 4

Solve steady two-dimensional Navier-Stokes equations in **non-dimensional form** using the finite volume method and SIMPLE algorithm with the specified boundary conditions for the geometry with **100×100** grid size as shown in the figure.

Convergence Criteria: Find the error of velocity and reduce it to 10^{-5}. Apply the finite volume discretization to replace all derivatives with the corresponding central difference expressions and CD convection scheme with uniform grid $M \times N$. Write the code in such a way so that you can input the values of Re, M, N. Submit the results and discussion for **Re=100 and 1000** in terms of streamlines, velocity vectors, u velocity along vertical centerline and v velocity along horizontal centerline.

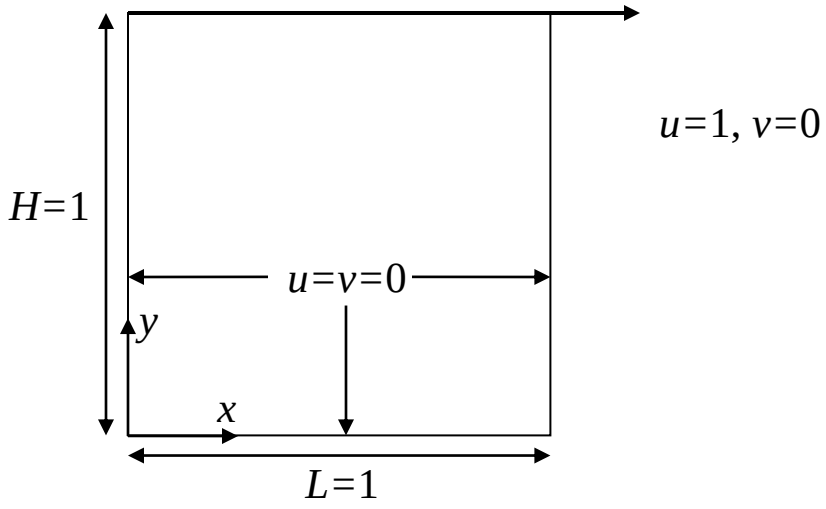

Figure: Flow inside a lid-driven cavity

Reference: U. Ghia, K.N. Ghia, and C. T. Shin, "High-Resolutions for Incompressible Flow Using the Navier-Stokes Equations", Journal of Computational Physics, vol. 48, pp. 387-411, 1982.