

Lid-Driven Cavity Flow: A Finite-Volume Implementation

Jay V. Evans

1 Governing Equations

The form of the incompressible Navier-Stokes equations, and their subsequent non-dimensionalization are taken from Ferziger and Perić [1]. Dimensional quantities are shown with a “*” superscript, and non-dimensional quantities are shown without modification. Conservation of mass, with dimensional units is shown in Eq. 1. Similarly, the dimensional form of the momentum equation is given in Eq. ??.

$$\frac{\partial u_i^*}{\partial x_i^*} = 0 \quad (1)$$

$$\frac{\partial u_i^*}{\partial t^*} + \frac{\partial(u_j^* u_i^*)}{\partial x_j^*} = \nu^* \frac{\partial^2 u_i^*}{\partial x_j^2} - \frac{1}{\rho^*} \frac{\partial p^*}{\partial x_i^*} \quad (2)$$

References

1. Ferziger, J. H. & Perić, M. *Computational Methods for Fluid Dynamics* 3rd ed. (Springer, Heidelberg, 2002).