\[ \mathbf{u} \cdot \nabla \mathbf{u} = \begin{pmatrix} \mathbf{u}, & \frac{\partial \mathbf{u}}{\partial x_1} \\ 0 \\ 0 \\ 0 \end{pmatrix} \]

for an incompressible fluid, the continuity equation is

\[ \nabla \cdot \mathbf{u} = 0 = \frac{\partial u_1}{\partial x_1} + \frac{\partial u_2}{\partial x_2} + \frac{\partial u_3}{\partial x_3} \]

\[ \Rightarrow \frac{\partial u_1}{\partial x_1} = 0 \]

\[ \therefore \mathbf{u} \cdot \nabla \mathbf{u} = 0 \text{ for unidir flow of any incompressible fluid.} \]

(94)