$$\frac{\partial \boldsymbol{u}'}{\partial t} + (\boldsymbol{U} \cdot \nabla)\boldsymbol{u}' + (\boldsymbol{u}' \cdot \nabla)\boldsymbol{U} + (\boldsymbol{u}' \cdot \nabla)\boldsymbol{u}' + f\hat{\boldsymbol{k}} \times \boldsymbol{u}' = -\frac{1}{\rho}\nabla p'$$

$$\nabla \cdot \boldsymbol{u}' = 0$$