Einstein Expansion of equations

Jammy

November 29, 2016

$$\frac{d}{dt}\rho = -\frac{d}{dx0}rhou_0 + \frac{d}{dx1}rhou_1 + \frac{d}{dx2}rhou_2 \tag{1}$$

$$\begin{aligned}\frac{d}{dt}rhou_0 = &-\frac{\partial}{\partial x0}\left(rhou_0u_0\right) + \frac{\partial}{\partial x1}\left(rhou_0u_1\right) + \frac{\partial}{\partial x2}\left(rhou_0u_2\right) \\ &+ \frac{mu}{Re}\left(\frac{\partial}{\partial x1}\frac{d}{dx0}u_1 + \frac{\partial}{\partial x2}\frac{d}{dx0}u_2 + 2\frac{d^2}{dx0^2}u_0 + \frac{d^2}{dx1^2}u_0 + \frac{d^2}{dx2^2}u_0\right)\end{aligned} \tag{2}$$

$$\begin{aligned}\frac{d}{dt}rhou_1 = &-\frac{\partial}{\partial x0}\left(rhou_1u_0\right) + \frac{\partial}{\partial x1}\left(rhou_1u_1\right) + \frac{\partial}{\partial x2}\left(rhou_1u_2\right) \\ &+ \frac{mu}{Re}\left(\frac{\partial}{\partial x0}\frac{d}{dx1}u_0 + \frac{\partial}{\partial x2}\frac{d}{dx1}u_2 + \frac{d^2}{dx0^2}u_1 + 2\frac{d^2}{dx1^2}u_1 + \frac{d^2}{dx2^2}u_1\right)\end{aligned} \tag{3}$$

$$\begin{aligned}\frac{d}{dt}rhou_2 = &-\frac{\partial}{\partial x0}\left(rhou_2u_0\right) + \frac{\partial}{\partial x1}\left(rhou_2u_1\right) + \frac{\partial}{\partial x2}\left(rhou_2u_2\right) \\ &+ \frac{mu}{Re}\left(\frac{\partial}{\partial x0}\frac{d}{dx2}u_0 + \frac{\partial}{\partial x1}\frac{d}{dx2}u_1 + \frac{d^2}{dx0^2}u_2 + \frac{d^2}{dx1^2}u_2 + 2\frac{d^2}{dx2^2}u_2\right)\end{aligned} \tag{4}$$