Reynolds stresses

$$\tilde{u}_i = \bar{u}_i + u'_i, \qquad \tilde{p} = \bar{p} + p'$$

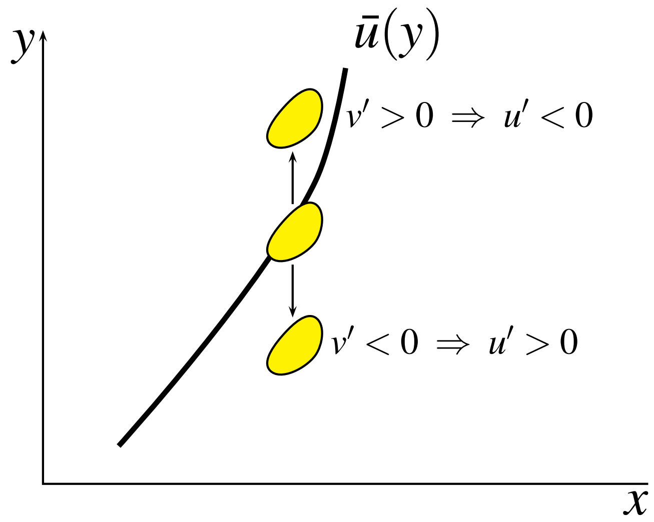
$$\frac{\partial \tilde{u}_i}{\partial t} + \tilde{u}_j \frac{\partial \tilde{u}_i}{\partial x_j} = -\frac{1}{\rho}\frac{\partial \tilde{p}}{\partial x_i} + \nu \frac{\partial^2 \tilde{u}_i}{\partial x_j \partial x_j}$$

$$\overline{\tilde{u}_j \frac{\partial \tilde{u}_i}{\partial x_j}} = \overline{\bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j}} + \overline{\bar{u}_j \frac{\partial u'_i}{\partial x_j}} + \overline{u'_j \frac{\partial \bar{u}_i}{\partial x_j}} + \overline{u'_j \frac{\partial u'_i}{\partial x_j}}$$

$$= \bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j} + \overline{u'_j \frac{\partial u'_i}{\partial x_j}} = \bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j} + \frac{\partial}{\partial x_j}\overline{u'_i u'_j}$$

$$\frac{\partial \bar{u}_i}{\partial t} + \bar{u}_j \frac{\partial \bar{u}_i}{\partial x_j} = -\frac{1}{\rho}\frac{\partial \bar{p}}{\partial x_i} + \frac{1}{\rho}\frac{\partial \sigma^T_{ij}}{\partial x_j}$$

$$\sigma^T_{ij} = \mu\left(\frac{\partial \bar{u}_i}{\partial x_j} + \frac{\partial \bar{u}_j}{\partial x_i}\right) - \rho\overline{u'_i u'_j}$$



$$\rho \overline{u'v'} < 0$$