

# effective turbulent diffusivity

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$\hat{x}$  – momentum: 
$$\frac{\partial \overline{\rho v_x}}{\partial t} + \frac{\partial \overline{\rho v_x v_z}}{\partial z} = 0$$

re-write as: 
$$\frac{\partial \overline{\rho v_x}}{\partial t} = - \frac{\partial \overline{\tau_{xz}}}{\partial z}$$

diffusion equation:

$$\frac{\partial \overline{\rho v_x}}{\partial t} = \frac{\partial}{\partial z} D_{\text{turb}} \frac{\partial \overline{\rho v_x}}{\partial z}$$

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effective turbulent diffusivity:

$$D_{\text{turb}} = - \overline{\tau_{xz}} / \frac{\partial \overline{\rho v_x}}{\partial z}$$