

$$\frac{\partial}{\partial x}(\alpha(x, y)u_x) + \frac{\partial}{\partial y}(\alpha(x, y)u_y) \text{ can be approximated by (assume } \Delta x = \Delta y = h)$$

$$\frac{1}{h^2} \left[\alpha_{i-1/2, j} u_{i-1, j} + \alpha_{i, j-1/2} u_{i, j-1} + \alpha_{i+1/2, j} u_{i+1, j} + \alpha_{i, j+1/2} u_{i, j+1} - (\alpha_{i-1/2, j} + \alpha_{i, j-1/2} + \alpha_{i+1/2, j} + \alpha_{i, j+1/2}) u_{i, j} \right]$$