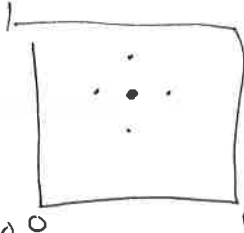


37.3

$$U_{xx} + U_{yy} = f(x, y)$$


$$\frac{U_E + U_W - 2U_c}{\Delta x^2} + \frac{U_N + U_S - 2U_c}{\Delta y^2} = f$$

$\Delta x = \Delta y$

$$U_E + U_W + U_N + U_S - 4U_c = f \Delta x^2$$

$$U_c = \frac{U_E + U_W + U_N + U_S - f \Delta x^2}{4}$$

37.4

$$\frac{U_E + U_W + U_N + U_S - 4U_c}{\Delta x^2} + 2U_c = 0$$

$$\frac{U_E + U_W + U_N + U_S + 2U_c \Delta x^2}{4} = U_c$$

$$U_E + U_W + U_N + U_S = U_c(1 - 2\Delta x^2)$$

$$U_c = \left(\frac{1}{1 - 2\Delta x^2} \right) (\text{sum neighbors})$$