



$$\nabla^2 f = \sum_{i=1}^n \frac{\partial^2 f}{\partial x_i^2}$$

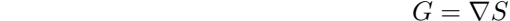
$$\nabla^2 f(x, y) \approx f(x-1, y) + f(x+1, y) + f(x, y-1) + f(x, y+1) - 4f(x, y)$$

$$K = \begin{pmatrix} 0 & 1 & 0 \\ 1 & -4 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

$$-4v_2v_3 + v_2 + 1v_3 + v_2 - 1v_3 + v_2 + 1v_3 - 1 = 0$$

U E = 0

$$\sqrt{2}I = \operatorname{div}(\nabla G)$$





$$\nabla^2 H = \operatorname{div}(\nabla S)$$

$$-4v_i + v_i + v_i - 1_j + v_i + 1_j + v_i - 1_j + \nabla^2 S(i, j)$$

U E = 0

$$\frac{d}{dx}(U) = D_x$$

$$\frac{d}{dy}(U) = D_y$$

$$S_x = \begin{pmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{pmatrix}$$

$$S_y = \begin{pmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{pmatrix}$$

$$-u_{i-1,j-1} - 2u_{i-1,j} - u_{i-1,j+1} + u_{i+1,j+1} + 2u_{i+1,j} + u_{i,j+1} = D_x(i,j)$$

$$-u_{i-1,j-1} - 2u_{i,j-1} - u_{i+1,j+1} + u_{i-1,j-1} + 2u_{i,j+1} + u_{i+1,j+1} = D_y(i,j)$$

$$\sqrt{2} = \operatorname{div}(\sqrt{2})$$



$$\sqrt{I(x,y)} = D(x,y)$$

$$\nabla I^2(i,j) = \frac{\partial D_x(i,j)}{\partial x} + \frac{\partial D_y(i,j)}{\partial y}$$

$$\begin{pmatrix} 0 & 1 & 0 \\ 1 & -4 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & -1 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 1 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 0 & 0 \\ -1 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & -1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$