Multi-Dimensional PDEs

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Multidimensional Δ
Linear operator
Central difference, 5 point stencil
"Compact form"
Vector form - Choose an ordering
vec, reshape

$$\frac{\partial^2}{\partial x^2} = \begin{pmatrix} A_x & & & \\ & A_x & & \\ & & \ddots & \\ & & & A_x \end{pmatrix}$$

$$\frac{\partial^2}{\partial x^2} = \begin{pmatrix} -2I_x & I_x & & \\ I_x & -2I_x & I_x & \\ & & \ddots & \end{pmatrix}$$

Kronecker product, kron(A,B)

$$A = I_y \otimes A_x + A_y \otimes I_x$$

Sparse matrices, special matrix forms, etc.