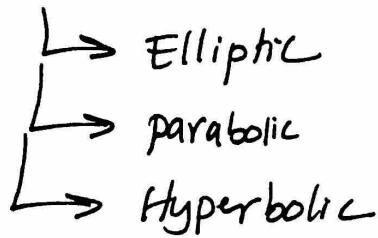


Partial Differential Equations (PDE's)

Three types of PDE's



① Elliptic Equation

$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} = 0$$

Laplace equation

$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} = f(x,y)$$

Poisson's Equation

T: Temperature, (x,y) space coordinates

② Parabolic equation

$$\frac{\partial T}{\partial t} = k \frac{\partial^2 T}{\partial x^2}$$

Diffusion Equation (1-Dimensional)

$$\frac{\partial T}{\partial t} = k \left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} \right)$$

Diffusion Equation (2-Dimensional)

T: temperature, (x,y) space coordinates

k: diffusivity, t: time

③ Hyperbolic equation

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 y}{\partial t^2}$$

wave equation

y: Deflection, x: Space coordinate

c²: constant \rightarrow t: time