1D Heat equation

Author

Today

Consider the evolution equation for the variable $c(x,t)$:

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

With the initial condition :

$$c(x,0) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp(-x^2/(2\sigma^2)) \tag{2}$$

and boundary condition

$$c(0,t) = 0 \text{ and } c(L,t) = 0 \ \forall t \tag{3}$$

Taking the Fourier transform of (1) :

$$\frac{\partial \hat{c}}{\partial t} = -\nu k^2 \hat{c} \tag{4}$$

That we easily can solve numerically.