

EAS 471 “Optional Computing Task” Feb., 2010

Use the relaxation method to obtain a numerical solution to the steady state heat equation

$$\kappa \nabla^2 T + Q(x, y) = 0 \quad (1)$$

on the domain $-1/2 \leq x, y \leq 1/2$. Assume the thermal diffusivity $\kappa = 1$, and that along the boundary condition $T = 0$. Specify the source term (heating function) as the Gaussian

$$Q(x, y) = \frac{1}{\sqrt{2\pi} \sigma} \exp\left(-\frac{x^2 + y^2}{2\sigma^2}\right) \quad (2)$$

where $\sigma = 0.1$. You might enjoy experimenting with other functions. Produce a contour plot of your solution(s).