

Exercise 16

Solve the diffusion equation with constant dissipation:

$$u_t - ku_{xx} + bu = 0 \quad \text{for } -\infty < x < \infty \quad \text{with } u(x, 0) = \phi(x),$$

where $b > 0$ is a constant. (*Hint:* Make the change of variables $u(x, t) = e^{-bt}v(x, t)$.)