

海洋大學河海工程學系 2005 工程數學(四)第二次作業

1.  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$

$u(x, y) = f(x + cy)$

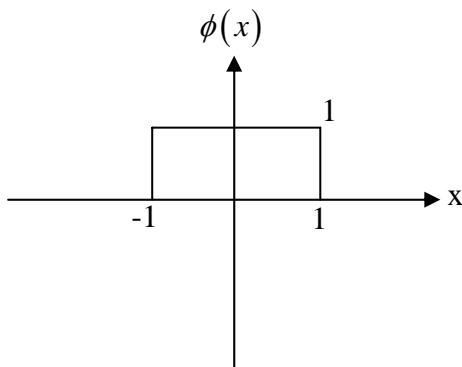
$\therefore c = \pm i$

$f(z) = z^2 = (x + yi)^2 = u(x, y) + iv(x, y)$

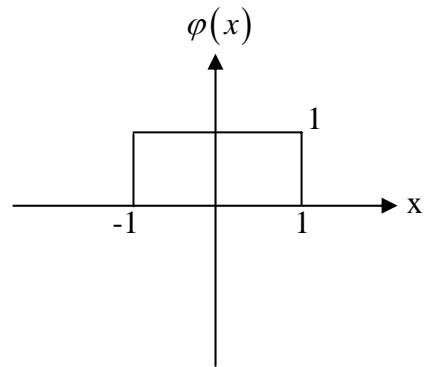
選定一  $f(z)$  畫出函數圖形

$u(x, y) = \text{constant}, v(x, y) = \text{constant}$ , 並驗證是否正交

2. D'Alembert solution:  $u(x, t) = \frac{1}{2}(\phi(x + ct) + \phi(x - ct)) + \frac{1}{2c} \int_{x-ct}^{x+ct} \phi(\tau) d\tau$



$\phi(x) = 0$



$\phi(x) = 0$

