

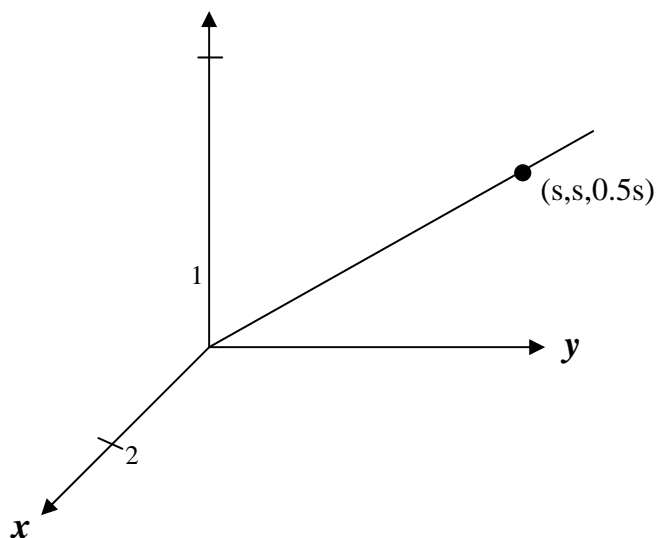
海洋大學河海工程學系 2005 工程數學(四)第二次作業小考解答

1. Solve  $u(x, y)$

$$\begin{cases} uu_x + u_y = 1 \\ u(s, s) = 0.5s \end{cases}$$

in terms of  $x(t, s)$ ,  $y(t, s)$  and  $u(t, s)$

and  $u = u(x, y)$



Parametric form:

$$x(t, s) = 0.5t^2 + 0.5st + s$$

$$y(t, s) = t + s$$

$$u(t, s) = t + 0.5s$$

Closed form:

$$u(x, y) = \frac{2(y-x) + (x-0.5y^2)}{2-y}$$