

## Exercise 2

Which of the following operators are linear?

(a)  $\mathcal{L}u = u_x + xu_y$

(b)  $\mathcal{L}u = u_x + uu_y$

(c)  $\mathcal{L}u = u_x + u_y^2$

(d)  $\mathcal{L}u = u_x + u_y + 1$

(e)  $\mathcal{L}u = \sqrt{1+x^2}(\cos y)u_x + u_{yxy} - [\arctan(x/y)]u$