

Exercise 3

For each of the following equations, state the order and whether it is nonlinear, linear inhomogeneous, or linear homogeneous; provide reasons.

(a) $u_t - u_{xx} + 1 = 0$

(b) $u_t - u_{xx} + xu = 0$

(c) $u_t - u_{xxt} + uu_x = 0$

(d) $u_{tt} - u_{xx} + x^2 = 0$

(e) $iu_t - u_{xx} + u/x = 0$

(f) $u_x(1 + u_x^2)^{-1/2} + u_y(1 + u_y^2)^{-1/2} = 0$

(g) $u_x + e^y u_y = 0$

(h) $u_t + u_{xxxx} + \sqrt{1 + u} = 0$