Engineering Mathematics Homework 1

· Due on 3/14.

(1 ~ 7) Determine if the differential equation is separable. If it is, find the general solution. Show the steps of derivation.

(1) $\mathrm{y}' = e^{3x+2y}$

(2) $\mathrm{y}' = (1+x)e^{x+y}$

(3) $\frac{1}{x} + y + (3y^2 + x)y' = 0$

(4) $\mathrm{xy}' + \mathrm{y} = \mathrm{y}^2$

(5) $sinxcosydx + cosxsinydy = 0$

(6) $y' + 2xy^2 = 0$

(7) $\frac{dy}{dx} = y^2 - 4$

(8 ~ 9) Solve the IVP (initial value problem).

(8) $xy' = x + y,\ y(1) = 3$

(9) $\mathrm{xy}' = y + 3x^4 cos^2\left(\frac{y}{x}\right),\ \mathrm{y}(1) = 0$

(10) Determine α so that the equation is exact, and obtain the general solution of the exact equation.

$2xy^3 - 3y - (3x + \alpha x^2 y^2 - 2\alpha y)y' = 0$