THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MMAT5520
Differential Equation & Linear Algebra

Assignment 1

Due date: Sept 30 (Tue)

Some questions and answers had been corrected. You may do either the original or revised questions.
Exercise 1.1: 2(c) (question)
Exercise 1.3: 2(c) (question and answer)
Exercise 1.6: 1(b) (answer)

Solve the following differential equations. If an initial condition is given, solve the initial value problem. If there is no initial condition, find the general solution of the equation.

Exercise 1.1:
1(a) $y' + y = 4e^{3x}$
2(c) $(x^2+4)y' + 3xy = 3x;\ y(0) = 3$

Exercise 1.2:
2(a) $xy' - y = 2x^2y;\ y(1) = 1$

Exercise 1.3:
Find the value of k so that the equation is exact and solve the equation.
2(c) $(2xy^2 + 3x^2)dx + (2x^k y + 4y^3)dy = 0$

Exercise 1.4:
1(e) $x^2y' = xy + y^2$

Exercise 1.5:
1(c) $xy' = y(x^2y - 1)$

Exercise 1.6:
Solve the following differential equation by using the given substitution.
1(b) $y' = \sqrt{x+y};\ u = x + y$

Exercise 1.7:
1(a) $yy'' + (y')^2 = 0$
2(b) $y' = \dfrac{x^2 + 2y}{x}$
2(d) $xy' + 2y = 6x^2\sqrt{y}$