Homework 2 (Due: 11/03)

(1) Solve

$$x^2 \frac{dy}{dx} - 2xy = 3y^4, \quad y(1) = \tfrac{1}{2}$$

(2) Solve

$$\frac{dy}{dx} = 2 + \sqrt{y - 2x + 3}$$

(3) Solve the following DE if it is known that y_1 is one of the solution.

$$xy'' + y' = 0; \quad y_1 = \ln x$$

(4) Solve the following DE

$$\frac{d^5u}{dr^5} + 5\frac{d^4u}{dr^4} - 2\frac{d^3u}{dr^3} - 10\frac{d^2u}{dr^2} + \frac{du}{dr} + 5u = 0$$

(5) Solve the following DE

$$y'' + y = 2x \sin x$$

(6) Solve the following DE with initial conditions

$$y''' + 8y = 2x - 5 + 8e^{-2x}, \quad y(0) = -5, y'(0) = 3,$$
$$y''(0) = -4$$

(7) Solve the following DE using the annihilator approach

$$y'' - 2y' + 5y = e^x \sin x$$

(8) Solve the following DE

$$y'' + 2y' + y = e^{-t} \ln t$$

(9) Solve the following DE by using the substitution $x = e^t$ to transform the given Cauchy-Euler equation to a differential equation with constant coefficients.

$$x^2y'' + 10xy' + 8y = x^2$$

(英制版)

(10) A mass weighing 24 pounds, attached to the end of a spring, stretches it 4 inches. Initially, the mass is released from rest from a point 3 inches above the equilibrium position. Find the equation of motion.

(選擇一個來寫)

(公制版)

A mass weighing 7.35 newtons, attached to the end of a spring, stretches it 10.208 centimeters. Initially, the mass is released from rest from a point 25 centimeters above the equilibrium position. Find the equation of motion.