MATH 286 PROBLEMS DUE MARCH 14, 2001

IGOR KRIZ

1. Find the general solution of

$$y'' + \frac{t}{1-t}y' - \frac{1}{1-t}y = 1 - t,$$

knowing that the fundamental solutions of the corresponding homogeneous equation are $y_1 = e^t$, $y_2 = t$.

2. A mass of 200 g stretches a spring 5 cm. If the mass is set in motion from its equilibrium position with a downward velocity of 10 cm/sec, and if there is no damping, determine the position u of the mass at any time t. When does the mass first return to its equilibrium position?

3. A spring is stretched 2 m by a mass of 5 kg. The damping constant is $\gamma = 0.2$ kg/s. Suppose we do not stretch the spring, but give it initial downward velocity of 1 m/s. Describe the position of the mass as a function of time.