Math 286(3.7-3.10) Hw 8 Name & Box number:

1. Find the general solution of the given differential equation or solution to IVP.

(a) $y''+2y'=3+4\sin 2t$

(b) $y''+9y=t^2e^{3t}+6$

(c) $y''+4y=t^2+3e^t$, $y(0)=0,\ y'(0)=2$

(d) $y''-2y'-3y=3te^{2t}$, $y(0)=1,\ y'(0)=0$

(e) $y''+4y=3\csc 2t,\ \ 0<t<\pi/2$

(f) $y''-5y'+6y=g(t)$, $g(t)$ is an arbitrary continuous function

2. Verify that the given functions y_1 and y_2 satisfy the corresponding homogeneous equation; then find a particular solution of the given nonhomogeneous equation.

(a) $t^2y''-2y=3t^2-1,\ \ t>0;\ \ y_1=t^2,\ \ y_2=t^{-1}$

(b) $x^2y''-3xy'+4y=x^2\ln x,\ \ x>0;\ \ y_1=x^2,\ \ y_2=x^2\ln x$

(c) $(1-x)y''+xy'-y=g(x),\ \ 0<x<1;\ \ y_1=e^x,\ \ y_2=x$, g(x) is an arbitrary continuous function.

3. Determine a suitable form for Y(t) if the method of undetermined coefficients is to be used and use a computer algebra system to find a particular solution of the given equation.

$$y''+4y=t^2\sin 2t+(6t+7)\cos 2t$$

4. Consider the vibrating system described by the initial value problem

$$u''+u=3\cos\omega t,\ \ u(0)=1,\ \ u'(0)=1$$

(a) Find the solution for $\omega\neq 1$.

(b) Plot the solution $u(t)$ for $\omega=0.7,0.8,0.9$.

(c) What happens to the solutions if we consider different initial conditions $u(0)=0,\ \ u'(0)=0$ for the same differential equation?

Use a computer software and attach the prints for (b) and (c).