Written Assignment #7:  
Second-Order Linear Inhomogeneous Equations  
Due 5:00pm Tuesday, March 16, 2003

You are encouraged to collaborate with your colleagues. For credit, however, your final write-up must be done individually. Show all your work and make your presentation comprehensible.

1. In the following problems, two linearly independent functions $y_1$ and $y_2$ are given. Verify that $y_1$ and $y_2$ are solutions to the associated homogeneous equation of the given inhomogeneous equation. Then, find the general solution of the inhomogeneous equation.

(a) $y'' + 4y = \sin^2 x; \quad y_1 = \sin(2x) \text{ and } y_2 = \cos(2x)$.
(b) $x^2y'' - 4xy' + 6y = x^3; \quad y_1 = x^2 \text{ and } y_2 = x^3$.
   You may assume that $x > 0$.

2. Solve the following initial value problems.

(a) $y'' - 6y' + 9y = 5 + 18x^2 - 4e^{3x}; \quad y(0) = 4, \quad y'(0) = 10$.
(b) $2y'' + 18y = 3 + 4\sec(3x); \quad y(0) = 2, \quad y'(0) = 6$. 

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