Pop Quiz

Ordinary Differential Equations

UCR Math-046-E01, Summer 2018

1. Suppose that $\sin(x)$ and x are complementary solutions, the solutions to the corresponding homogeneous differential equation, to

$$\big(\sin(x) - x\cos(x)\big)\ddot{y} - x\sin(x)\,\dot{y} + \sin(x)\,y = \tan(x)\big(\sin(x) - x\cos(x)\big).$$

   Using the method *variation of parameters*, what is the particular solution to this equation? Feel free to leave your answer in terms of one or more integrals.

There is another question on the back.

2. Compute the Laplace transform of the following function. I will write some (possibly) helpful Laplace transforms on the board, and you may consult your own table of common Laplace transforms.

$$g(t) = \begin{cases} t^2 & 0 \le t < 2 \\ e^{3t-6} + 4t - 4 & 2 < t \end{cases}$$