

HOMEWORK 10
DIFFERENTIAL EQUATIONS
DUE 09-14

Show your work!

- (1) Consider a linear differential equation $\dot{y} + g(t)y = b(t)$.
 - (a) Suppose that, when you plug in y_{in} to the left-hand side, you get $f(t)$. Show that, if you plug in Cy_{in} to the left-hand side, then you get $Cf(t)$.
 - (b) Suppose that, when you plug in y_1 to the left-hand side, you get $f_1(t)$; and, when you plug in y_2 to the left-hand side, you get $f_2(t)$. Find a formula for the result when you plug in $y_1 + y_2$ to the left-hand side. Justify your answer.
- (2) Consider a linear differential equation $\dot{y} + g(t)y = b(t)$. Show that, if $\hat{G}(t) = g(t)$, then $y_{\text{h}} = e^{-\hat{G}(t)}$ is a solution of the associated homogeneous equation.
- (3) **Four** book problems: #1.8.2, 7, 15, 16.