

HOMEWORK 10
DIFFERENTIAL EQUATIONS
DUE 2013-10-01

Show your work!

- (1) Consider the differential equation

$$y'' + 5y' + 6y = 0$$

from class (and Example 3.1.2–3).

- (a) Show that, after multiplying by the integrating factor $\mu = e^{2t}$, the left-hand side becomes an exact derivative. (HINT: Compute the derivative of an expression of the form $P(t)y' + Q(t)y$ and set it equal to the left-hand side.)
- (b) Use your answer to (a) to convert the second-order equation into a first-order equation. (HINT: If $\square' = 0$, then $\square = \dots$?)
- (c) Solve your first-order equation from (b). Compare your solution to Example 3.1.2.

- (2) Consider the differential equation

$$y'' + 5y' + 3y = 0.$$

- (a) Find two solutions y_1 and y_2 such that $W(y_1, y_2) \neq 0$.
- (b) Show that $W(y_1, y_2)$ is a constant multiple of e^{-5t} .

- **Five** book problems: #3.1.11, 12, 18, 21, 23.