Homework Assignment #7   Fall 2013 - MATH308

due Monday September 30

Topics covered : *linear homogeneous equations of second order with constant coefficient: the cases of repeated roots, the method of reduction of order (section 3.4)*

1. Consider the differential equation $25y'' - 20y' + 4y = 0$.

   (a) Find the general solution of this equation;

   (b) Find the solution of this equation satisfying the initial conditions $y(0) = \alpha$, $y'(0) = 5$;

   (c) For the solutions obtained in the previous item find the values of α , if any, for which the solutions tends to $+\infty$ as $t \to +\infty$ and the values of α, if any, for which the solutions tend to $-\infty$ as $t \to +\infty$.

2. Given the solution $y_1(t) = t^2$ of the differential equation

$$t^2 y'' + 2ty' - 6y = 0, \quad t > 0.$$

   Use the method of reduction of order to find a second solution $y_2(t)$ of this equation such that $\{y_1(t), y_2(t)\}$ is a fundamental set of solutions on $t > 0$.