

MATH 2610, EXAMPLES OF SECTION 4.7

VANDERBILT UNIVERSITY

Question 1. Find two linearly independent solutions of

$$x^2y'' - 4xy' + 6y = 0.$$

Solutions.

1. This is a Cauchy-Euler equation with $a = 1$, $b = -4$ and $c = 6$. Its characteristic equation is then

$$a\lambda^2 + (b - a)\lambda + c = \lambda^2 - 5\lambda + 6 = 0,$$

whose solutions are

$$\lambda_1 = 2, \text{ and } \lambda_2 = 3.$$

Therefore

$$y_1 = x^2, \text{ and } y_2 = x^3$$

are two linearly independent solutions of the equation.