

MATH 302

CHAPTER 5

SECTION 5.6: REDUCTION OF ORDER

CONTENTS

What Is Reduction Of Order

2

We study the ODE

$$P_0(x)y'' + P_1(x)y' + P_2(x)y = F(x).$$

where $P_0(x)$, $P_1(x)$, $P_2(x)$, $F(x)$ are continuous functions in the variable x .

Goal: Find the general solutions to the ODE above.

Trick:

EXAMPLE 1. Find the general solution of

$$xy'' - (2x + 1)y' + (x + 1)y = x^2$$

given that $y_1(x) = e^x$ is a solution to the complementary equation.

EXAMPLE 2. Find the general solution of

$$x^2 y'' + xy' - y = x^2 + 1$$

given that $y_1(x) = x$ is a solution to the complementary equation.

EXAMPLE 3. Find the general solution to

$$x^2 y'' - 3xy' + 3y = 0$$

given that $y_1(x) = x$ is a solution.