Math 302

Chapter 5

Section 5.6: Reduction Of Order

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What Is Reduction Of Order

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:

- Have a solution to the complementary equation.
- Use variation of parameter.

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

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

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