Week 8: Variation of Parameters

Welcome to the Weekly Review for MATH 2420. This week’s review talks about Variation of Parameters. We would like to thank Patrick Bourque and the Spring 2015 MATH 2420 students for allowing us to film the Weekly Reviews.

The following problems are presented in the Week 8 videos. Thank you!

Part A: Variation of Parameters

1. Background Information
2. Solve:

(a) \( y'' + y = \sec(x) \)

(b) \( y'' - 4y' + 5y = xe^{2x} \)
(c) Given that \( y_1 = e^x \) is a solution to \( xy'' - (x + 1)y' + y = 0 \). Solve \( xy'' - (x + 1)y' + y = x^2e^{2x} \)
Part B: Cauchy - Euler Equation

1. Background Information
2. Solve:

(a) \( x^2 \frac{d^2 y}{dx^2} + 7x \frac{dy}{dx} + 8y = 0 \)

(b) \( x^2 \frac{d^2 y}{dx^2} - 11x \frac{dy}{dx} + 36y = 0 \)
3. \[ x^2 \frac{d^2 y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^3 \ln(x) \]