Lec 35: Nonhomogeneous Linear Equations, cont'd (17.2)

In this lecture we will continue our discussion on nonhomogeneous second order differential equations and we will turn our attention to the method of **undetermined coefficients**. In this method, we simply guess what the solution might look like, and then solve for the precise coefficients.

EXAMPLE 1. Determine the solution to the differential equation $y'' + 6y' + 5y = e^{3x}$.

EXAMPLE 2. Determine the solution to the differential equation $y'' + 2y' - 3y = \sin x$.

EXAMPLE 3. Determine the solution to the differential equation $y'' + 2y' - 3y = 3x^2 + 4x - 1$.

EXAMPLE 4. Determine the solution to the differential equation $y''+2y'-3y = (x^2+4)e^{2x}$.

EXAMPLE 5. Determine the solution to the differential equation $y'' + 2y' - 3y = e^x$.

In summary: To find the particular solution to the nonhomogeneous differential equation $ay'' + by' + cy = F(x)$ guess a general solution of the same form as $F(x)$. If your initial guess already appears in the homogeneous solution then multiply it by an x (or x^2 if necessary). In general it is good to guess if you see polynomials, exponentials, and sines or cosines.