4.4-Variation of Parameter

#UCLA #Y1Q3 #Math33B

Variation of Parameters

Key Definitions

Variation of Parameters - a method to find a particular solution to 4.3.1-Inhomogeneous 2nd Order Linear Differentials when 4.3.2-Method of Undetermined Coefficients is not possible
i.e. p, q are not constant or $g(t)$ is not "simple"

Variation of Parameters

Given the fundamental set of solutions y_1, y_2 to a 4.2-Homogenous 2nd Order Linear:

$$y'' + py' + qy = 0$$

s.t. y_1, y_2 are lin. indep. as given by the 4.1-2nd Order Linear Differentials > Wronskian:

$$W(t) := y_1 y_2' - y_2 y_1' \neq 0$$

Then the 4.3.1-Inhomogeneous 2nd Order Linear Differentials:

$$y'' + py' + qy = g(t)$$

has a particular sol.:

$$y_p(t) = y_1 \int \frac{-y_2(t)g(t)}{W(t)}\,dt + y_2 \int \frac{y_1(t)g(t)}{W(t)}\,dt$$