Method of Undetermined Coefficients

Use to solve

$$L(y) = g(x)$$

where

$$L = a_nD^n + a_{n-1}D^{n-1} + \cdots + a_1D + a_0\ .$$

First, determine the complementary function y_c which is the general solution to

$$L(y) = 0\ .$$

Next, *guess* a particular solution y_p based on the form of $g(x)$. Consider y_p as a sum of trial functions determined as follows:

If $g(x)$ contains a term which is a constant multiple of ...	trial function to appear as a term of y_p*
k (a constant)	A
x^m	$c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0$
e^{cx}	Ae^{cx}
$\sin(px+q)$	$A\sin(px+q) + B\cos(px+q)$
$\cos(px+q)$	$A\sin(px+q) + B\cos(px+q)$
x^me^{cx}	$(c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0)e^{cx}$
$x^m\sin(px+q)$	$(c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0)\sin(px+q)$ $+(d_mx^m + d_{m-1}x^{m-1} + \cdots + d_1x + d_0)\cos(px+q)$
$x^m\cos(px+q)$	$(c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0)\sin(px+q)$ $+(d_mx^m + d_{m-1}x^{m-1} + \cdots + d_1x + d_0)\cos(px+q)$
$e^{cx}x^m\sin(px+q)$	$e^{cx}(c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0)\sin(px+q)$ $+e^{cx}(d_mx^m + d_{m-1}x^{m-1} + \cdots + d_1x + d_0)\cos(px+q)$
$e^{cx}x^m\cos(px+q)$	$e^{cx}(c_mx^m + c_{m-1}x^{m-1} + \cdots + c_1x + c_0)\sin(px+q)$ $+e^{cx}(d_mx^m + d_{m-1}x^{m-1} + \cdots + d_1x + d_0)\cos(px+q)$

* If a constant multiple of a term of the trial function is already a term of the complementary solution y_c, multiply that trial function by x^j where j is the smallest natural number such that the new trial function no longer duplicates a term of y_c.