

Forms to find particular solutions of
 $py''(x) + qy'(x) + ry(x) = g(x)$, for $p \neq 0$, q, r constant,
using the method of undetermined coefficients

$g(x)$	$y_p(x)$
$a_n x^n + \cdots + a_1 x + a_0$	$x^s (A_n x^n + \cdots + A_1 x + A_0)$
$a e^{\alpha x}$	$x^s A e^{\alpha x}$
$a \cos(\beta x) + b \sin(\beta x)$	$x^s (A \cos(\beta x) + B \sin(\beta x))$
$(a_n x^n + \cdots + a_1 x + a_0) e^{\alpha x}$	$x^s (A_n x^n + \cdots + A_1 x + A_0) e^{\alpha x}$
$(a_n x^n + \cdots + a_1 x + a_0) \cos(\beta x)$ $+ (b_m x^m + \cdots + b_1 x + b_0) \sin(\beta x)$	$x^s \{ (A_p x^p + \cdots + A_1 x + A_0) \cos(\beta x)$ $+ (B_p x^p + \cdots + B_1 x + B_0) \sin(\beta x) \}$ where $p = \max(n, m)$.
$a e^{\alpha x} \cos(\beta x) + b e^{\alpha x} \sin(\beta x)$	$x^s \{ A e^{\alpha x} \cos(\beta x) + B e^{\alpha x} \sin(\beta x) \}$
$(a_n x^n + \cdots + a_1 x + a_0) e^{\alpha x} \cos(\beta x)$ $+ (b_m x^m + \cdots + b_1 x + b_0) e^{\alpha x} \sin(\beta x)$	$x^s \{ (A_p x^p + \cdots + A_1 x + A_0) e^{\alpha x} \cos(\beta x)$ $+ (B_p x^p + \cdots + B_1 x + B_0) e^{\alpha x} \sin(\beta x) \}$ where $p = \max(n, m)$.

- Plug the form of y_p into the given differential equation to solve for A, B, A_p, B_p , etc.
- The non-negative integer s is chosen to be the smallest integer so that no term in the particular solution $y_p(x)$ is a solution to the corresponding homogeneous equation $ay''(x) + by'(x) + cy(x) = 0$.
- The polynomials $A_n x^n + \cdots + A_1 x + A_0$, etc must include ALL powers of x up to n even if some coefficients in $(a_n x^n + \cdots + a_1 x + a_0)$ are zero.