Summary for MUC guesses

(book p. 156)

$f(x)$	$y_p(x)$
$P_m(t) = b_0 + b_1 x + \cdots + b_m x^m$	$x^s \left[A_0 + A_1 x + \cdots + A_m x^m \right]$
$a\cos kx + b\sin kx$	$x^s \left[A\cos kx + B\sin kx \right]$
$e^{rx}(a\cos kx + b\sin kx)$	$x^s e^{rx} \left[A\cos kx + B\sin kx \right]$
$P_m(x)\, e^{rx}$	$x^s \left[A_0 + A_1 x + \cdots + A_m x^m \right] e^{rx}$
$P_m(x)(a\cos kx + b\sin kx)$	$x^s \left[(a_0 + a_1 x + \cdots + a_m x^m)\cos kx + (b_0 + b_1 x + \cdots + b_m x^m)\sin kx \right]$

Ex write the form of the particular soln of

$$y'' + y = t\sin t + 2\cos t$$

Upstairs: homog. first:

$$y_h'' + y_h = 0 \Rightarrow y_1 = \cos t,\ y_2 = \sin t$$

$$y_p = t\left[(a_0 + a_1 t)\cos 3t + (b_0 + b_1 t)\sin 3t\right]$$

EX

$$y'' + 3y' = 2t^4 + t^2 e^{-3t} + \sin 3t.$$

$2t^4 e^0$ ↑ ; $\sin 3t$ ↑ $\dfrac{e^{i3t}}{2i} - \dfrac{e^{-i3t}}{2i}$

homog. first:

$$y_h'' + 3y_h' = 0$$

$+ \cosh 3t$

C.E: $r^2 + 3r = 0 \Rightarrow r = 0, -3$

$y_1 = c$, $y_2 = e^{-3t}$

$$y_p = t\left[a_0 + a_1 t + a_2 t^2 + a_3 t^3 + a_4 t^4\right]$$

$$+ t(b_0 + b_1 t + b_2 t^2) e^{-3t}$$

$$+ \alpha \cos 3t + \beta \sin 3t$$

EX $y'' + 2y' + 2y = 3e^{-t} + 2e^{-t}\cos t + 4e^{-t} t^3 \sin t$

$$y_h'' + 2y_h' + 2y_h = 0$$

$$r^2 + 2r + 2 = 0 \qquad r = \frac{-2 \pm \sqrt{4-8}}{2}$$

$$= -1 \pm i$$

$$y_1 = e^{-t}\cos t, \quad y_2 = e^{-t}\sin t.$$

$$y_p = a_0 e^{-t} + \not{*} e^{-t}\left[t(b_0 + b_1 t + b_2 t^2)\cos t + t(c_0 + c_1 t + c_2 t^2)\sin t\right]$$