

## Ansatz method to find a particular solution

### Basic idea:

The particular solution is “of related type” to inhomogeneity  $f$

**Notation:**  $A_n, B_n, P_n$  polynomials of degree  $\leq n$

Inhomogeneity	particular solution
$P_n$	$t^m A_n$
$P_n e^{\omega t}$	$t^m A_n e^{\omega t}$
$P_n \cos(\alpha t)$	$t^m (A_n \cos(\alpha t) + B_n \sin(\alpha t))$
$P_n \sin(\alpha t)$	$t^m (A_n \cos(\alpha t) + B_n \sin(\alpha t))$
$P_n e^{\omega t} \cos(\alpha t)$	$t^m e^{\omega t} (A_n \cos(\alpha t) + B_n \sin(\alpha t))$
$P_n e^{\omega t} \sin(\alpha t)$	$t^m e^{\omega t} (A_n \cos(\alpha t) + B_n \sin(\alpha t))$

Choose  $m = 0, 1, 2, \dots$  as small as possible so that no term in the ansatz solves the homogeneous equation  $L[y] = 0$ .