

DIFFERENTIAL EQUATIONS

B.Sc. Part II / 4th Paper / diff. eqns

Linear diff. eqns with constant coefficients

Important

$$\frac{1}{D} f(x) = \int f(x) dx$$

Case I If $f(x) = e^{ax}$ then

$$(m_1 D^2 + m_2 D + m_3) y = e^{ax} \quad \text{i.e. } f(D) y = e^{ax}$$

$$\begin{aligned} \therefore P.I. &= \frac{1}{f(D)} e^{ax} \\ &= e^{ax} \cdot \frac{1}{f(a)} \quad \text{where } f(a) \neq 0. \end{aligned}$$

i.e. when you have to find out P.I. and R.H.S. is of the form e^{ax}

then

$$P.I. = \frac{1}{f(D)} e^{ax}$$

Now put a in place of D , provided $f(a) \neq 0$.

$$\therefore P.I. = \frac{1}{f(a)} e^{ax}$$