

$$= \mathcal{J}^{-1} \left\{ \frac{1/4}{s^2} - \frac{1/4}{s^2+4} \right\}$$

$$= \frac{1}{4} t - \frac{1}{8} \sin 2t$$

7.2 #33 $\mathcal{J}^{-1} \left\{ \frac{1}{(s^2+1)(s^2+4)} \right\}$

$$= \mathcal{J}^{-1} \left\{ \frac{As+B}{s^2+1} + \frac{Cs+D}{s^2+4} \right\}$$

$$(As+B)(s^2+4) + (Cs+D)(s^2+1) = 1$$

$$As^3 + Bs^2 + 4As + 4B + Cs^3 + Cs + Ds^2 + D = 1$$

$$A+C=0, \quad B+D=0, \quad 4A+C=0, \quad 4B+D=1$$

$$C=-A$$

$$D=-B$$

↓

↓

$$4A-A=0$$

$$4B-B=1$$

$$A=0$$

$$3B=1$$

$$\Rightarrow C=0$$

$$B=1/3 \Rightarrow D=-1/3$$

$$= \mathcal{J}^{-1} \left\{ \frac{1/3}{s^2+1} + \frac{-1/3}{s^2+4} \right\}$$

$$= \frac{1}{3} \sin t - \frac{1}{6} \sin 2t$$