



The eqns are

$$(s^2 + s) \theta_1 - s \hat{\theta} = T \quad (i)$$

$$-s \theta_1 + (s+1) \hat{\theta} = 0 \quad (ii)$$

$$\Rightarrow \frac{\hat{\theta}}{T} = \frac{1}{s^2 + s + 1} \quad (iii)$$

Now, ~~$25 \hat{\theta} = 50 \theta_2$~~ $25 \hat{\theta} = 50 \theta_2$

$$\Rightarrow \theta_2 = \frac{1}{2} \hat{\theta} \quad (iv)$$

From (iii) & (iv), we have

$$\frac{\theta_2}{T} = \frac{1/2}{s^2 + s + 1}$$

Rough

$$\begin{vmatrix} s^2 + s & T \\ -s & 0 \end{vmatrix}$$

$$= sT$$

$$\begin{vmatrix} s^2 + s & -s \\ -s & s+1 \end{vmatrix}$$

$$= s^2 + 2s + s - s^2 = s^2 + s + 1$$