15.17

onsdag 4 januari 2023 15:32

$$y'(t) = m_{in} - m_{ut}$$

$$m_{ut} = 2K\,y(t)$$

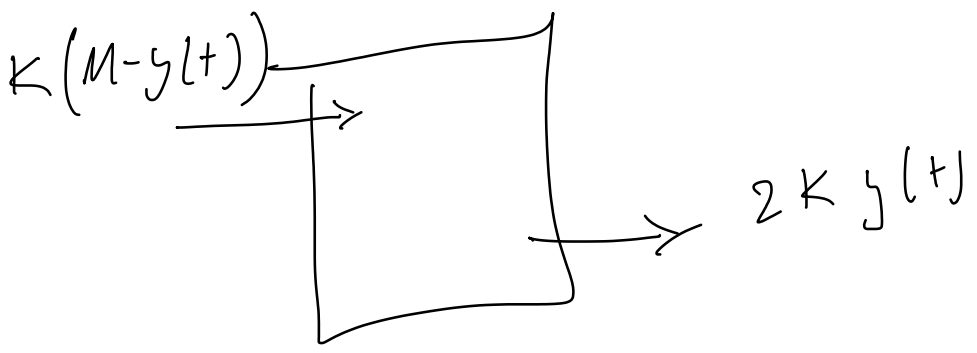
$$m_{in} = K\big(M - y(t)\big)$$

antalet hårda klappar vid tiden t

$y(t)$ = antalet mjuka klappar i lagret

M = antalet klappar

$y(0) = M/2$ ← antalet mjuka klappar



$$y'(t) = K\big(M - y(t)\big) - 2K\,y(t) = KM - Ky(t) - 2Ky(t) =$$

$$= KM - 3K\,y(t)$$

$$y'(t) + 3K\,y(t) = KM$$

$$g(t) = 3K \qquad G(t) = 3Kt \qquad IF = e^{3Kt}$$

$$y(t)\cdot e^{3Kt} = \int KM e^{3Kt} = \frac{M}{3} e^{3Kt} + C$$

$$y(t) = \frac{M}{3} + C e^{-3Kt}, \quad y(0) = \frac{M}{3} + C = \frac{M}{2}, \quad C = \frac{M}{6}$$

$$y(t) = M\left(\frac{1}{3} + \frac{1}{6} e^{-3Kt}\right)$$