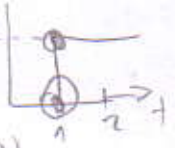
$$y''+y=\begin{cases}0 & \text{dla } t<1\\ 1 & \text{dla } 1\le t\le 3\\ 0 & \text{dla } t>3\end{cases}$$

$\eta(t-1)$ →



$\mathcal{L}\{y(t)\}=Y(s)$; $\mathcal{L}\{y''\}=s^2\cdot Y(s)-s\cdot y(0)-s^0\cdot y'(0)$ $\quad y(0)=0$; $y'(0)=0$

$$s^2\cdot Y(s)+Y(s)=\frac{1}{s}\cdot e^{-1\cdot s}-\frac{1}{s}\cdot e^{-3\cdot s}$$

$$Y(s)\cdot(s^2+1)=\frac{1}{s}\cdot e^{-s}-\frac{1}{s}\cdot e^{-3\cdot s}\ /:(\ )$$

$$Y(s)=\frac{1\cdot e^{-s}}{s(s^2+1)}-\frac{1}{s(s^2+1)}\cdot e^{-3\cdot s}$$

$$\frac{1}{s(s^2+1)}=\frac{A}{s}+\frac{B\cdot s+C}{s^2+1}$$

$$1=A(s^2+1)+(B\cdot s+C)\cdot s$$

$$1=\underline{A}s^2+A+\underline{B}\cdot s^2+C\cdot s$$

s^2 : $A+B=0 \quad -A=B\Rightarrow B=-1$

s^1 : $C=0$

s^0 : $A=1$ $\qquad \underline{A=1}$ $\quad \underline{B=-1}$

$$Y(s)=\left(\frac{1}{s}+\frac{-1\cdot s}{s^2+1}\right)\cdot e^{-s}-\left(\frac{1}{s}+\frac{-1\cdot s}{s^2+1}\right)\cdot e^{-3\cdot s}$$

$$y(t)=\left(1(t)\Big|_{t:=t-1}-\cos t\Big|_{t=t-1}\right)-\left(1(t)\Big|_{t:=t-3}-\cos t\Big|_{t:=t-3}\right)$$

$$y(t)=1(t-1)-\cos(t-1)-1(t-3)+\cos(t-3)$$

$$y(t)=(1(t-1)-\cos(t-1))\cdot\eta(t-1)-(1(t-3)-\cos(t-3))\cdot\eta(t-3)$$

$$y(t)=(1-\cos(t-1))\cdot\eta(t-1)-(1-\cos(t-3))\cdot\eta(t-3)$$