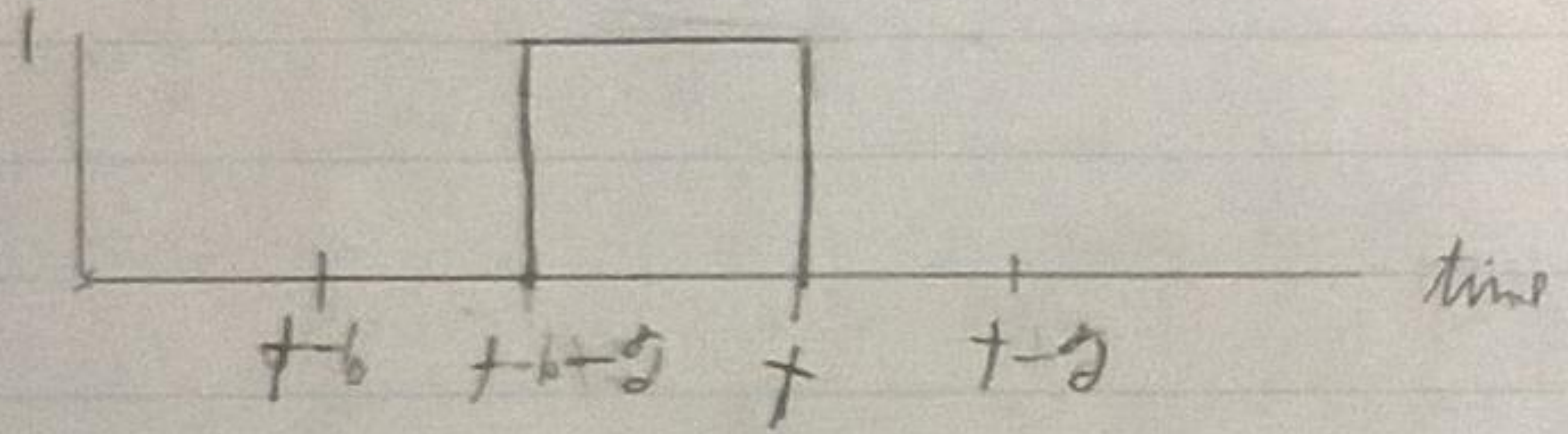
$R_{xx} = E[x(t)\,x(t-\tau)] = E\left[\int_{t-b}^{t} y(t')\,dt' \int_{t-b-\tau}^{t-b} y(t'')\,dt''\right]$

$= E\left[\int_{t-b}^{t}\int_{t-b-\tau}^{t-\tau} y(t')\,y(t'')\,dt'\,dt''\right] = \int_{t-b}^{t}\int_{t-b-\tau}^{t-\tau} E[y(t')\,y(t'')]\,dt'\,dt''$

since $R_{yy}(\tau) = \delta(\tau)$

$R_{xx} = \int_{t-b}^{t}\int_{t-b-\tau}^{t-\tau} \delta(t'-t'')\,dt'\,dt''$

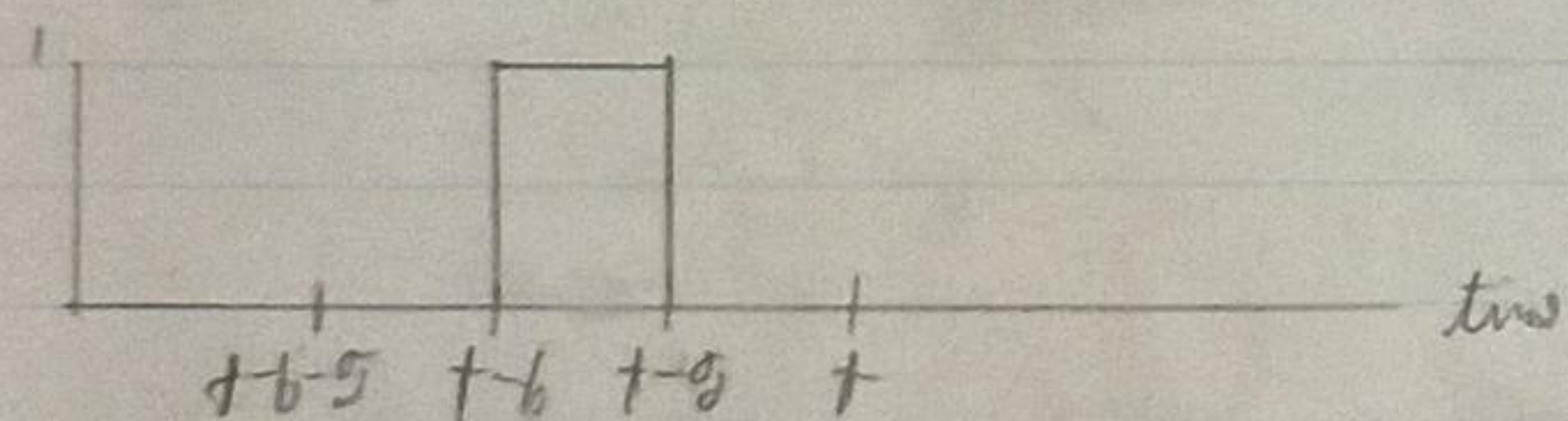
This can be seen graphically when $\tau<0$.



Since the integrand is 1 where t' and t'' overlap, and 0 elsewhere.

so $R_{xx} = t-(t-b-\tau) = b+\tau$ when $\tau<0$ and $b>|\tau|$

$\tau<0$:



$R_{xx} = t-\tau-(t-b) = b-\tau$ when $\tau>0$ and $b>\tau$

$\tau=0$: $R_{xx} = t-(t-b) = b$ when $\tau=0$

if $b<|\tau|$ $R_{xx}=0$, since there is no overlap of t' and t''.

$$\boxed{R_{xx} = b-|\tau| \quad \text{when } b-|\tau|>0}$$