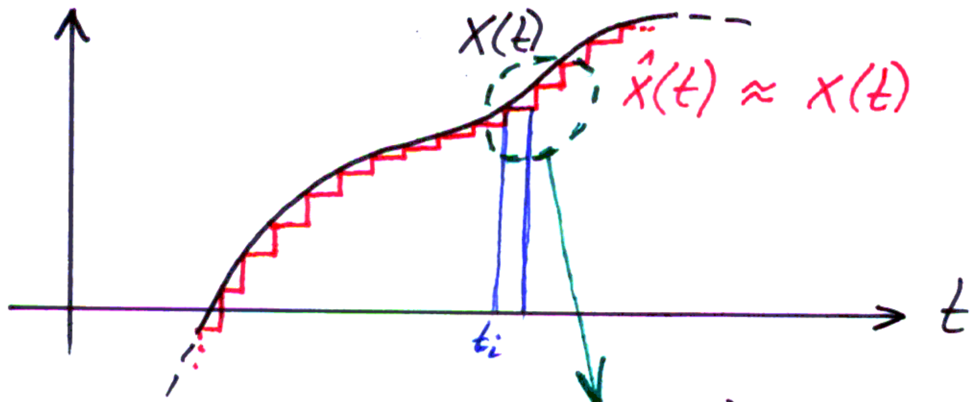
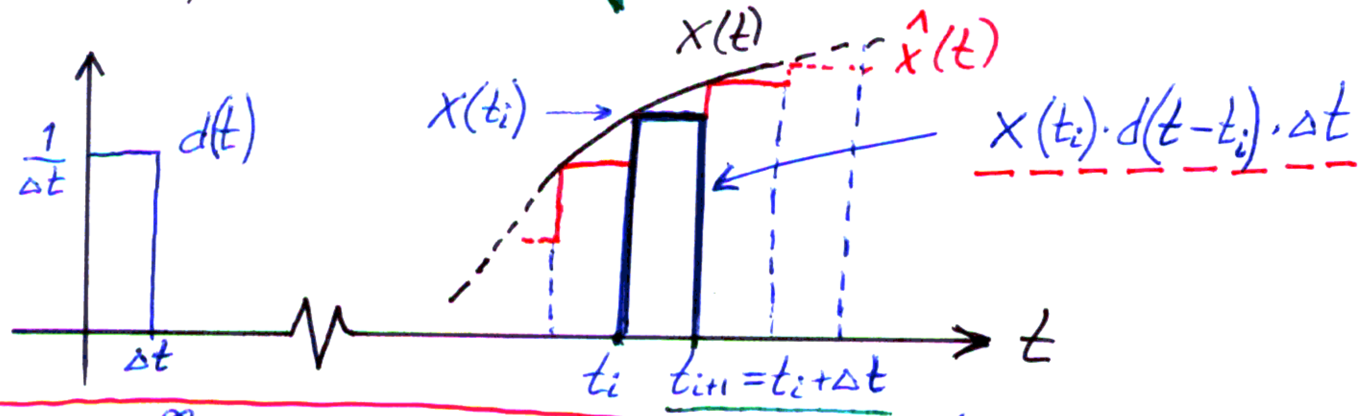
FÖRTYDLIGANDE HÄRLEDNING AV FALTNINGSINTEGRALEN





$$\boxed{\hat{x}(t) = \sum_{i=-\infty}^{\infty} x(t_i)\cdot d(t-t_i)\cdot \Delta t}$$

EN RIEMANN-SUMMA

$\left(\begin{array}{l} t_i = k\cdot \Delta t \\ \text{där } k \in [-\infty, \infty] \end{array} \right)$

Notera:

- $\delta(t) = \lim_{\Delta t \to 0} d(t)$
- $x(t) = \lim_{\Delta t \to 0} \hat{x}(t) = \Big/ \begin{array}{l} d(t) \to \delta(t) \\ \Delta t \to d\tau \\ t_i \to \tau \\ \sum \to \int \end{array} \Big/ = \int_{-\infty}^{\infty} x(\tau)\delta(t-\tau)\,d\tau$

se def.-integralen för $\delta(t)$!

$x(t) \longrightarrow \boxed{h(t)} \longrightarrow y(t) = \mathcal{H}\{x(t)\}$; $h(t) = \mathcal{H}\{\delta(t)\}$

LTI

$\hat{x}(t)$ $\qquad$ $\hat{y}(t)$

$$\hat{y}(t) = \mathcal{H}\{\hat{x}(t)\} = \mathcal{H}\Big\{\sum_{i=-\infty}^{\infty} x(t_i)\,d(t-t_i)\,\Delta t\Big\}$$

$$= \Big/ \text{LINJÄRT SYSTEM} \Big/ = \sum_{i=-\infty}^{\infty} x(t_i)\,\mathcal{H}\{d(t-t_i)\}\cdot \Delta t$$

$$\underline{y(t)} = \lim_{\Delta t \to 0} \hat{y}(t) = \Big/ \text{Se gränsvärden ovan!} \Big/ = \int_{-\infty}^{\infty} x(\tau)\cdot \mathcal{H}\{\delta(t-\tau)\}\,d\tau$$

$$= \Big/ \begin{array}{c} \text{TIDSINVARIANT SYSTEM} \\ \& \ \mathcal{H}\{\delta(t)\} = h(t) \end{array} \Big/ = \underline{\int_{-\infty}^{\infty} x(\tau)\,h(t-\tau)\,d\tau}$$