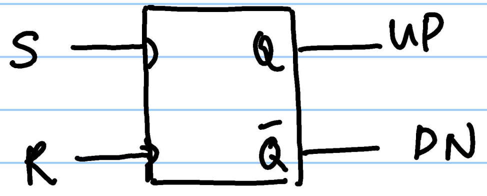
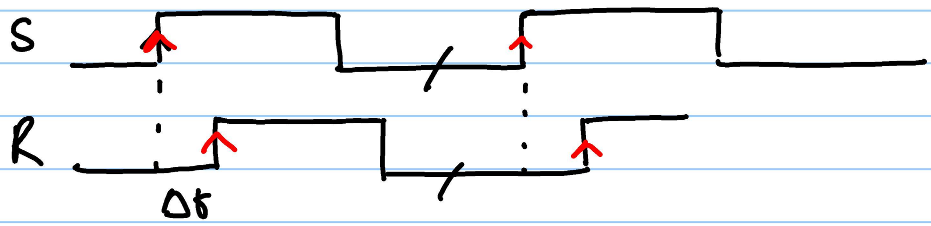
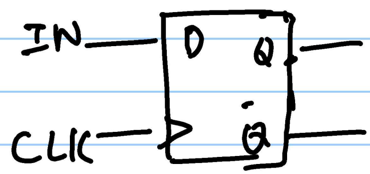
Lecture # 10

Note Title 20-08-2018

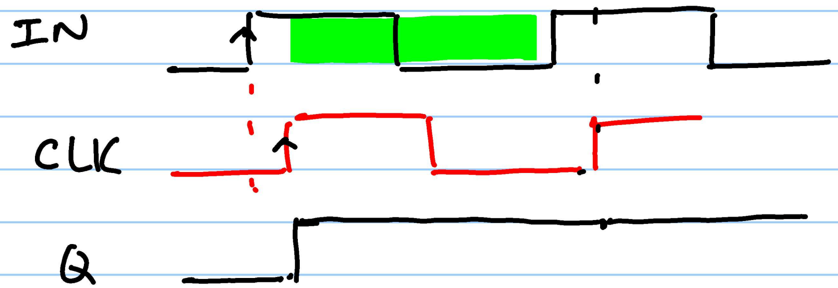
S-R flip-flop PD

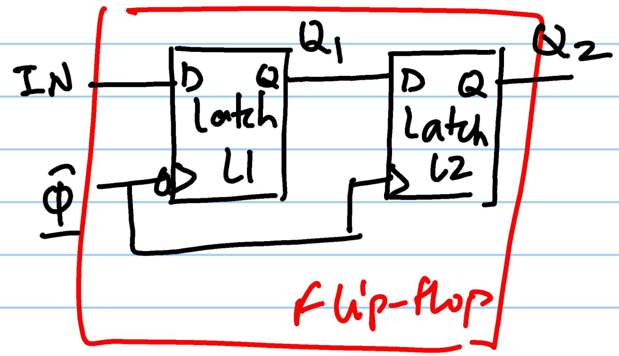




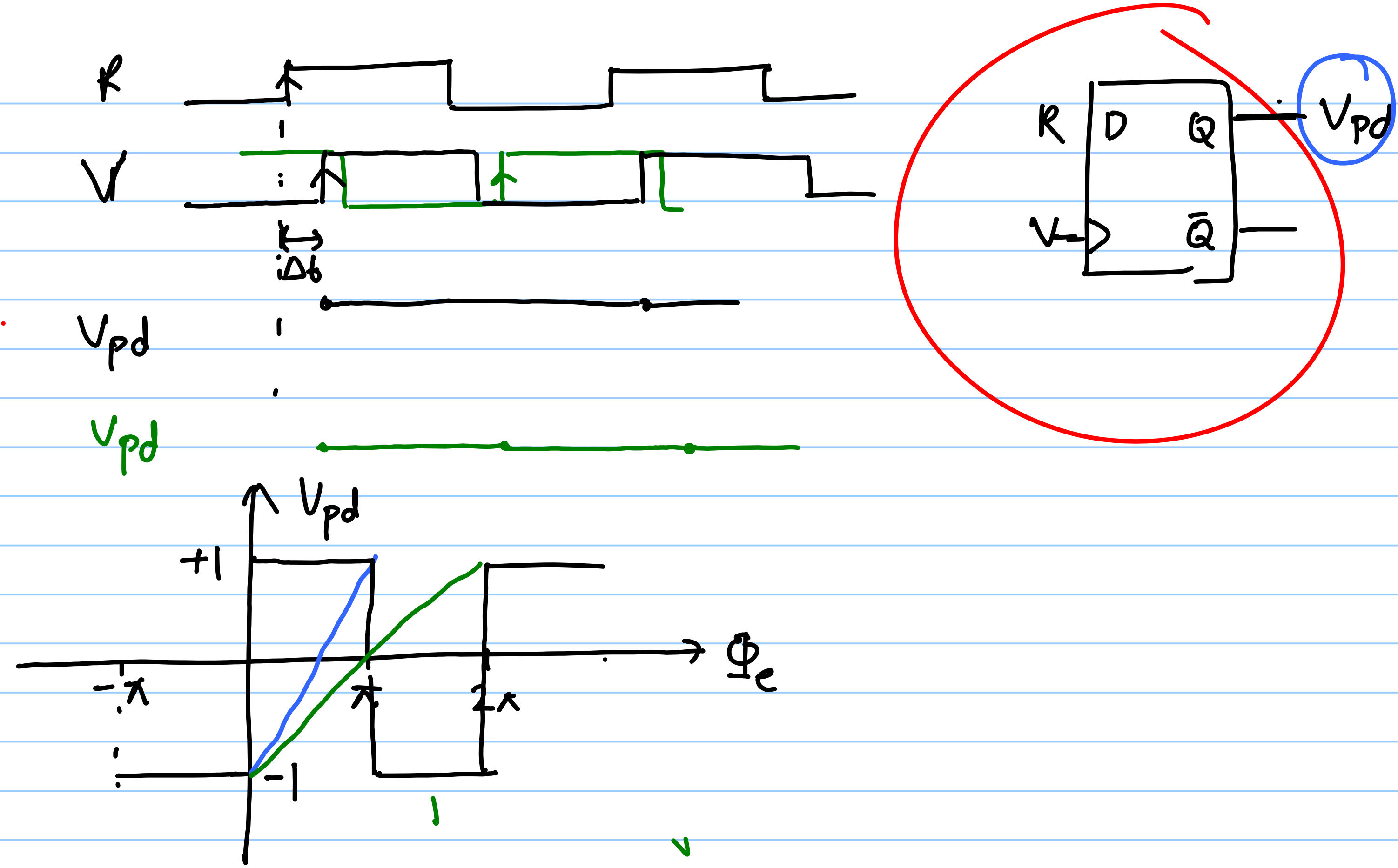


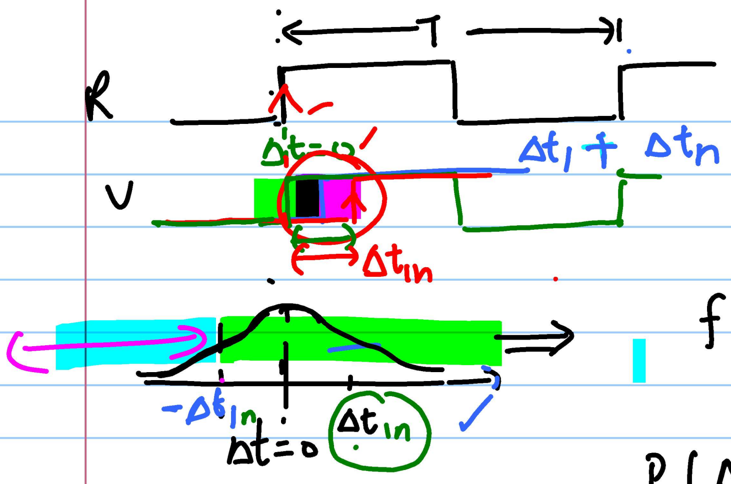
	UP	DN
S ↑	1	0
R ↑	0	1



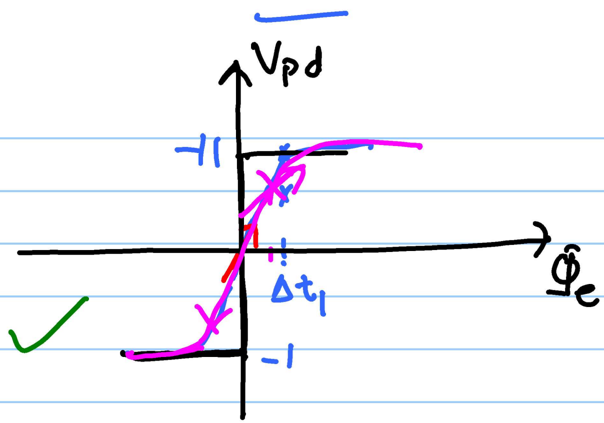


1. XOR-based PD
2. SR based PD
3. D-flipflop based PD





$$f(\Delta t_n) = \frac{1}{\sqrt{2\pi}} \frac{1}{\sigma_j} \exp\left(-\frac{(\Delta t_n)^2}{2\sigma_j^2}\right)$$



$$P(\Delta t_n \leq \Delta t_1) = \int_{-\infty}^{\Delta t_1} f(\Delta t_n) \cdot d(\Delta t_n)$$

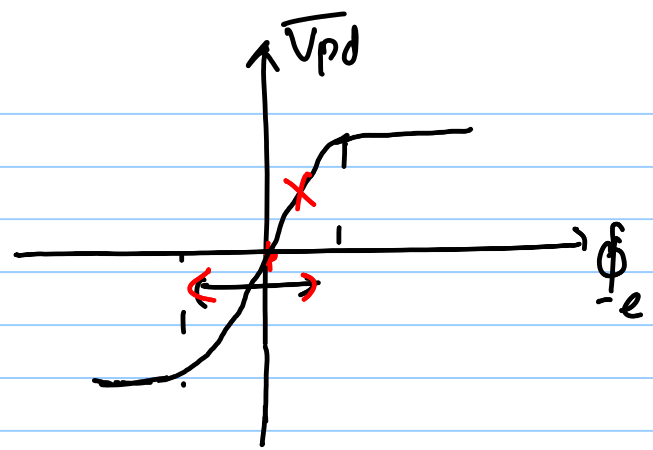
$$\overline{V_{pd}}\left(\Phi_e = 2\pi \cdot \frac{\Delta t_1}{T}\right) = +1 \times P(\Delta t_1 + t_n > 0) - 1\, P(\Delta t_1 + t_n \leq 0)$$

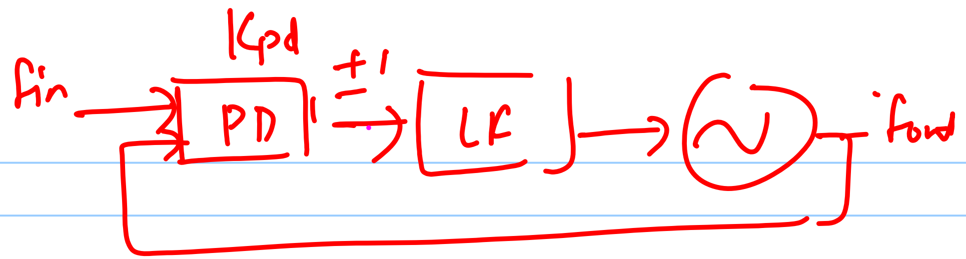
$$= P(t_n \geq -\Delta t_1) - P(t_n \leq -\Delta t_1)$$

$$= \int_{-\Delta t_1}^{\infty} f(\Delta t_n)\, d(\Delta t_n) - \int_{-\infty}^{-\Delta t_1} f(\Delta t_n)\, d(\Delta t_n)$$

$$\overline{V_{pd}} = 1 - 2\int_{-\infty}^{-\Delta t_1} f(\Delta t_n) \cdot d(\Delta t_n)$$

$$\frac{d(\overline{V_{pd}})}{d(\Delta t_1)} = - f(-\Delta t_1) \times -1$$


Vpd
1
1
φe


fin
Kpd
±1
PD
LF
fout