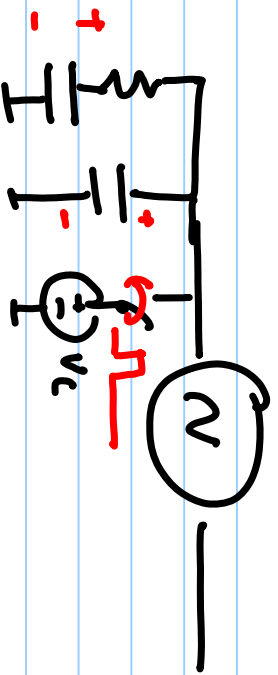
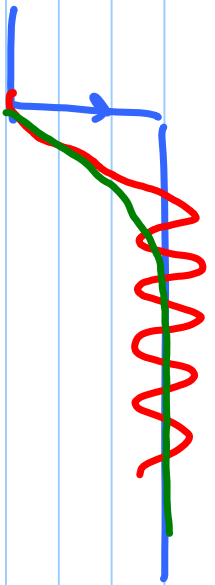
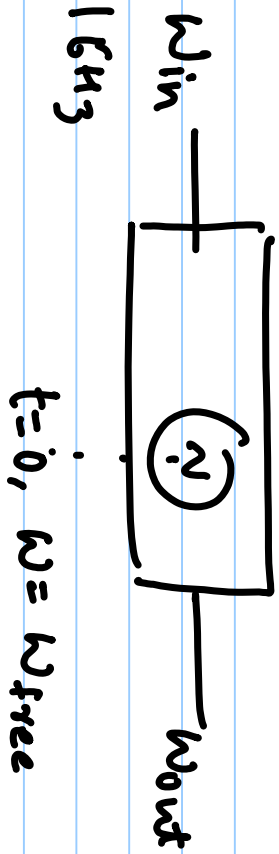


Lecture # 23

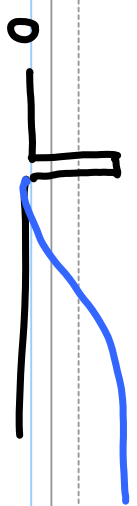
Assign. 3

Hold-in range of PLL

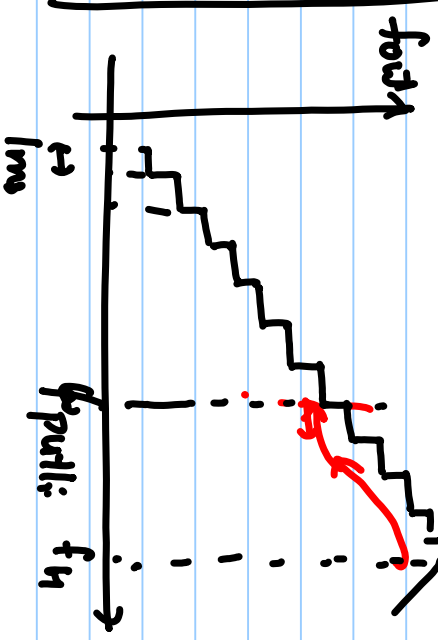
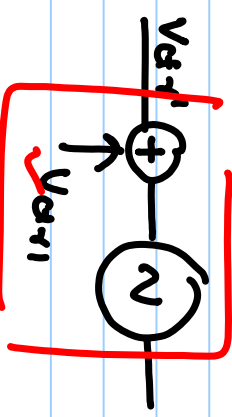
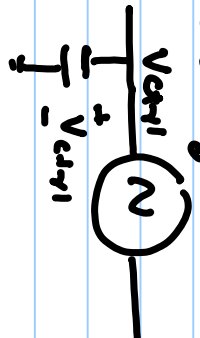
$$\Delta\omega_L < \Delta\omega_P < \Delta\omega_H$$



$\omega_{in} = \text{fixed}$

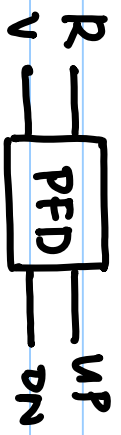
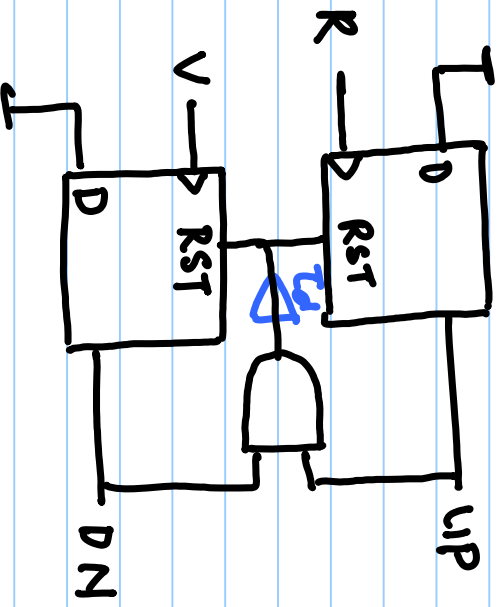


$\omega_{out} = \omega_{free} = \omega_{in} + \Delta\omega_H$



PLL Building Blocks

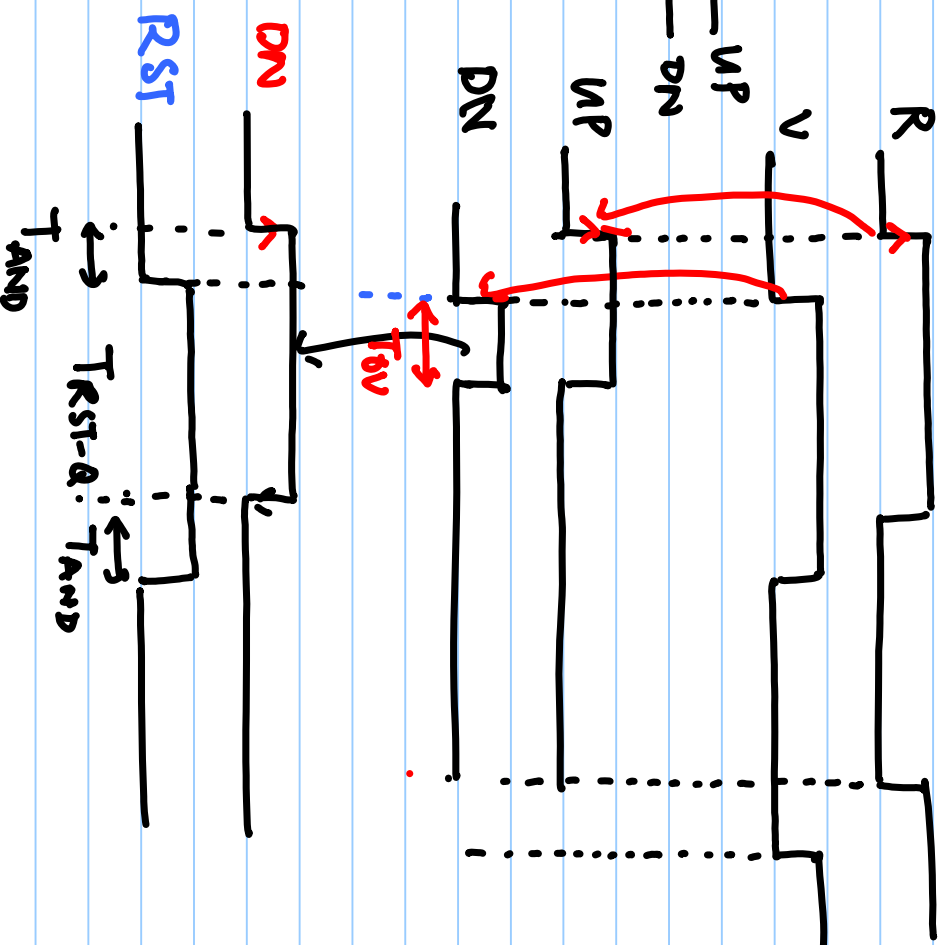
Phase Frequency Detector:

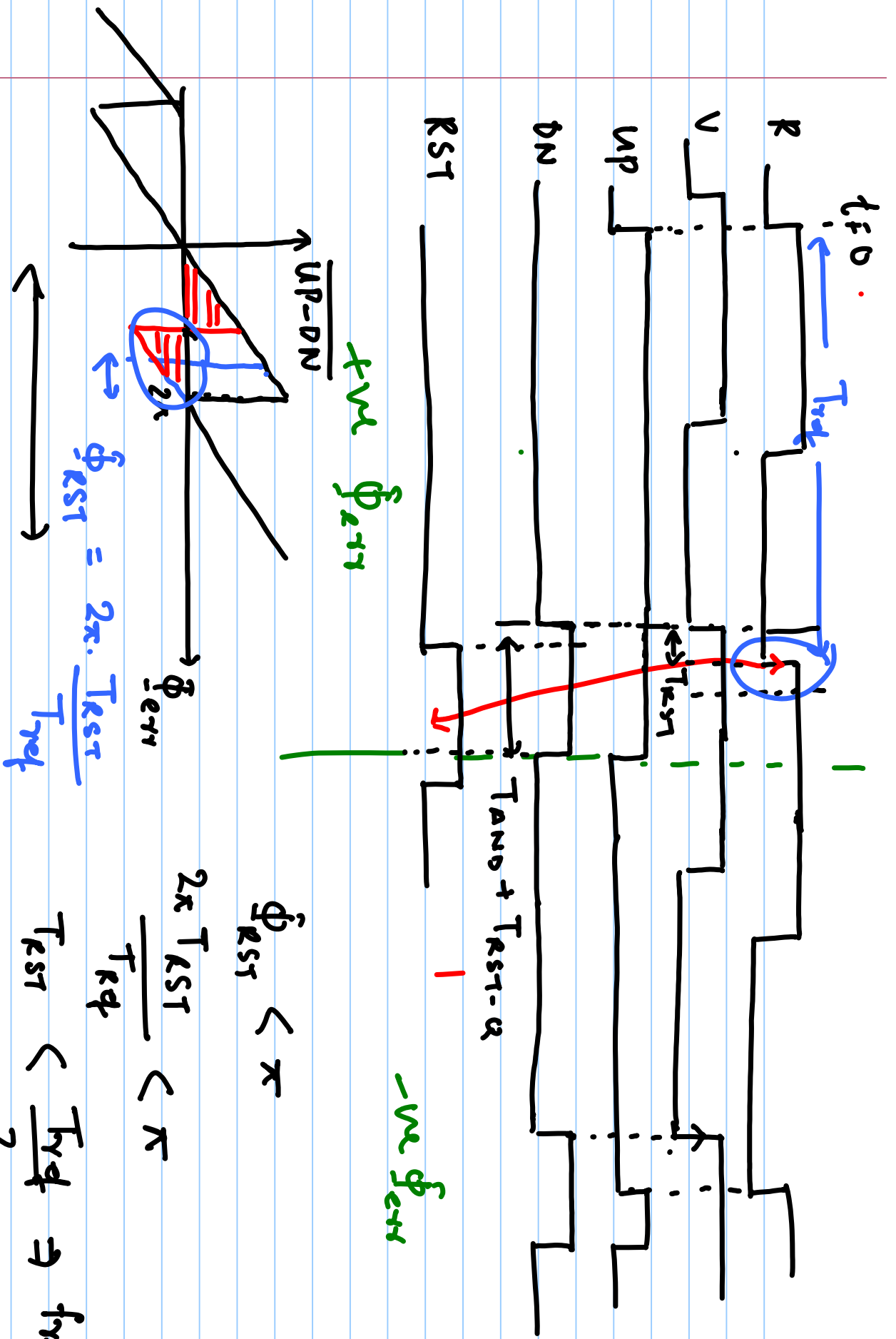


T_{OV} : Eliminates dead zone prob.

$$T_{OV} = T_{AND} + T_{RST-Q} + T_d$$

$$T_{RST} = T_{RST-Q} + T_{AND} + T_d$$





$\pm ve \phi_{req}$

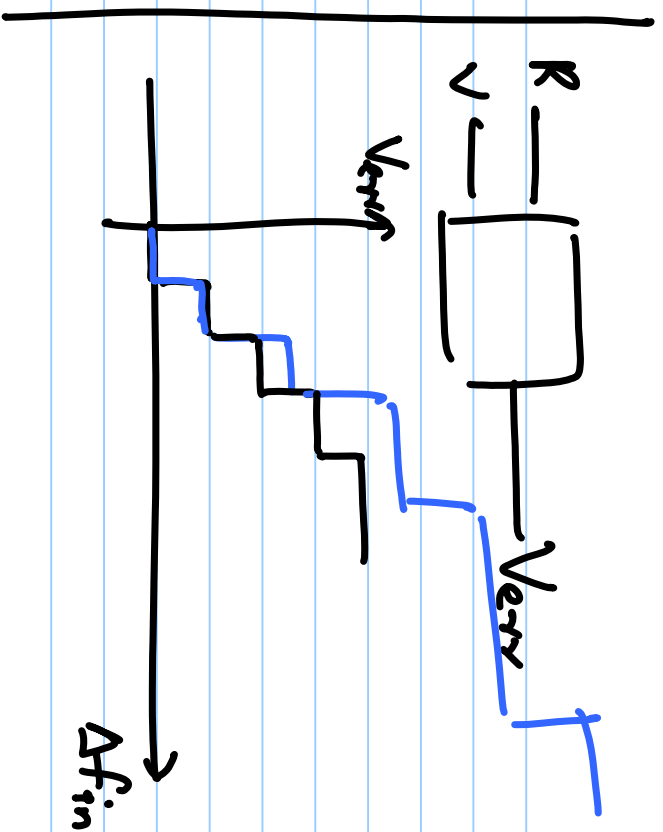
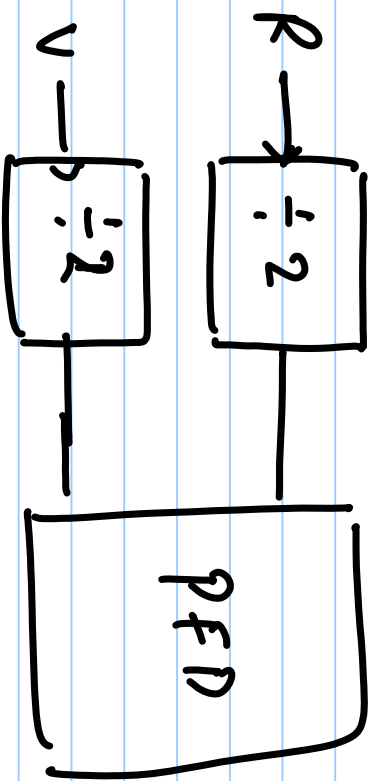
$-ve \phi_{req}$

$$\phi_{RST} = 2\pi \cdot \frac{T_{RST}}{T_{req}}$$

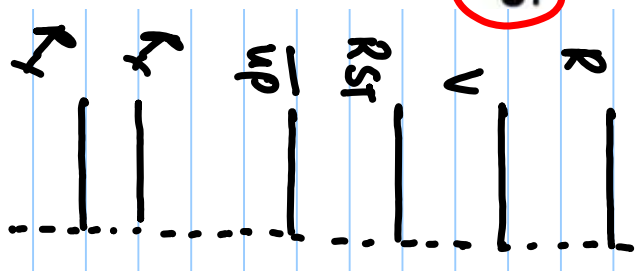
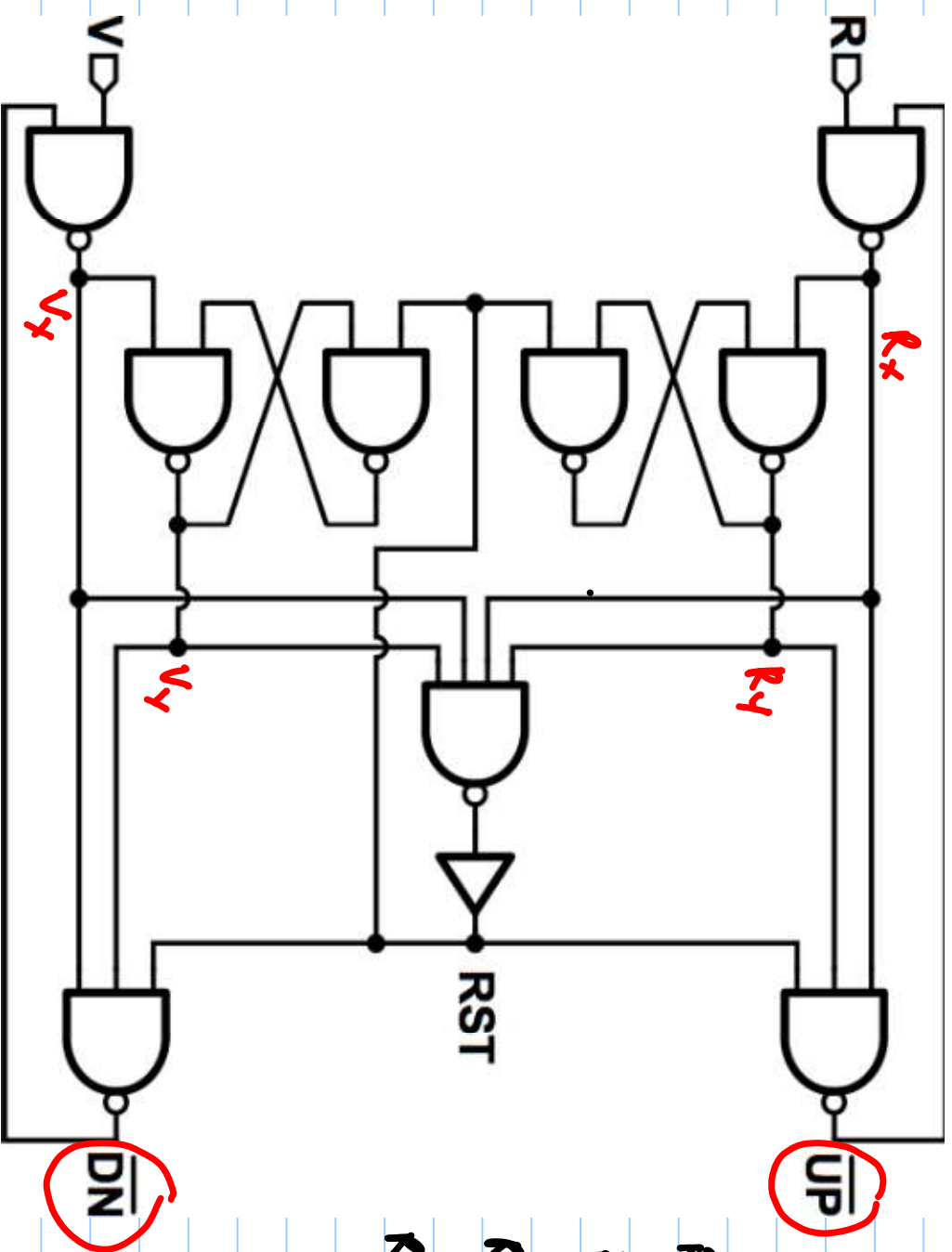
$$\phi_{RST} < \pi$$

$$\frac{2\pi T_{RST}}{T_{req}} < \pi$$

$$T_{RST} < \frac{T_{req}}{2} \Rightarrow f_{req} < \frac{1}{2T_{RST}}$$



NAND-PFD



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