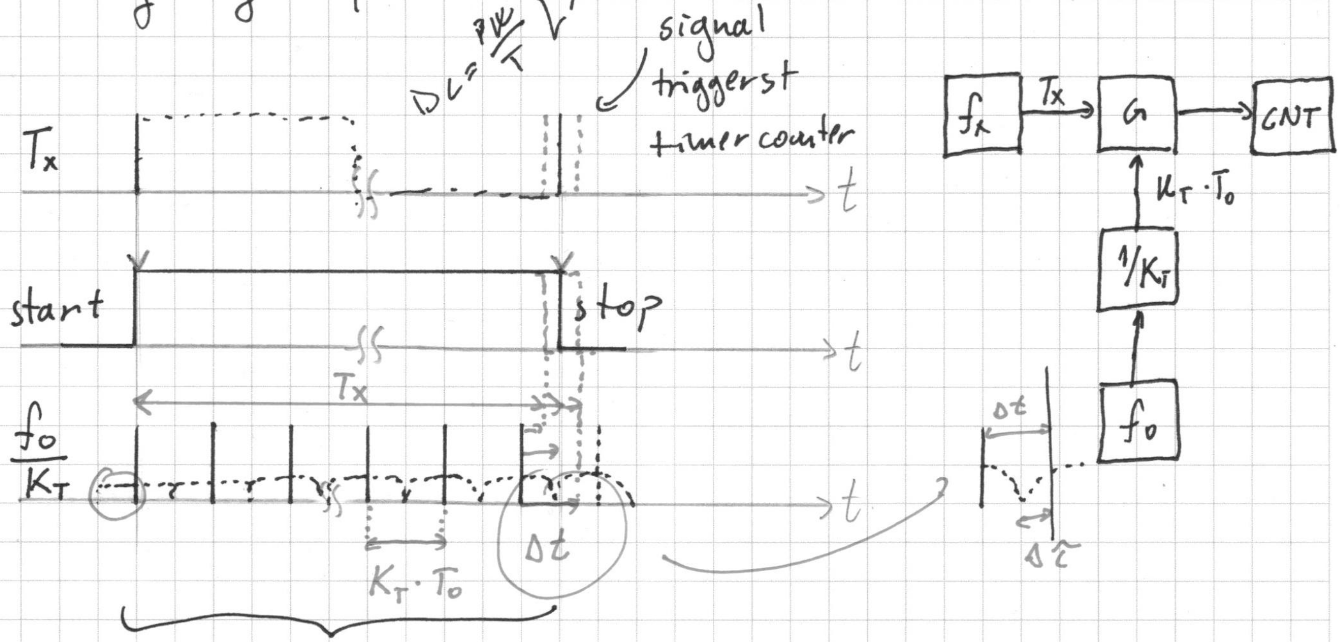
Measuring signal period



Z impulses $\longrightarrow T_x = (z-1)\cdot K_T T_0 + \Delta t \;,\; \Delta t \in [0, K_T T_0)$

$= z \cdot K_T T_0 + \Delta\tau \;,\; \Delta\tau = \Delta t - K_0 T_0$

$\Delta\tau \in \left(-\frac{K_T T_0}{2}, +\frac{K_T T_0}{2}\right)$

Resolution $Q_T = (\Delta T)_q = \frac{K_T}{f_0} = K_T \cdot T_0$

Measured period $= T_i = Z \cdot Q_T = Z \cdot K_T \cdot T_0 \;\rightarrow\; f_{ind} = \frac{1}{T_i} = \frac{1}{Z K_T T_0}$

Absolute error limit $= M_T = \pm \frac{K T_0}{2} = \pm \frac{Q_T}{2}$ $\pm\frac{K_T T_0}{2}$

Measurement error: $E_i = T_i - T_x = Z K_T T_0 - Z K_T T_0 - \Delta\tau = -\Delta\tau$

Relative error limit $= m_T = \frac{M_T}{T_x} = \pm \frac{K_T T_0}{2 T_x} = \pm \frac{K_T T_0}{2} f_x$

Therefore:
- we want high value counter (for low f_x)
- we want low K_T
- we want low T_0
- relative error increases with f_x low f
- $f_{T\,min} = z_{max} \cdot K_{max} \cdot T_0$, $f_{max} = \frac{2 \cdot m_T}{\underbrace{K_{min} \cdot T_0}_{(2kHz \Rightarrow 200kHz)}}$ & $f_{f,min}$