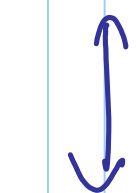
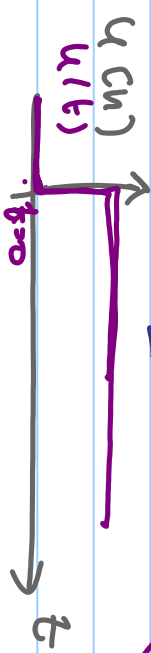
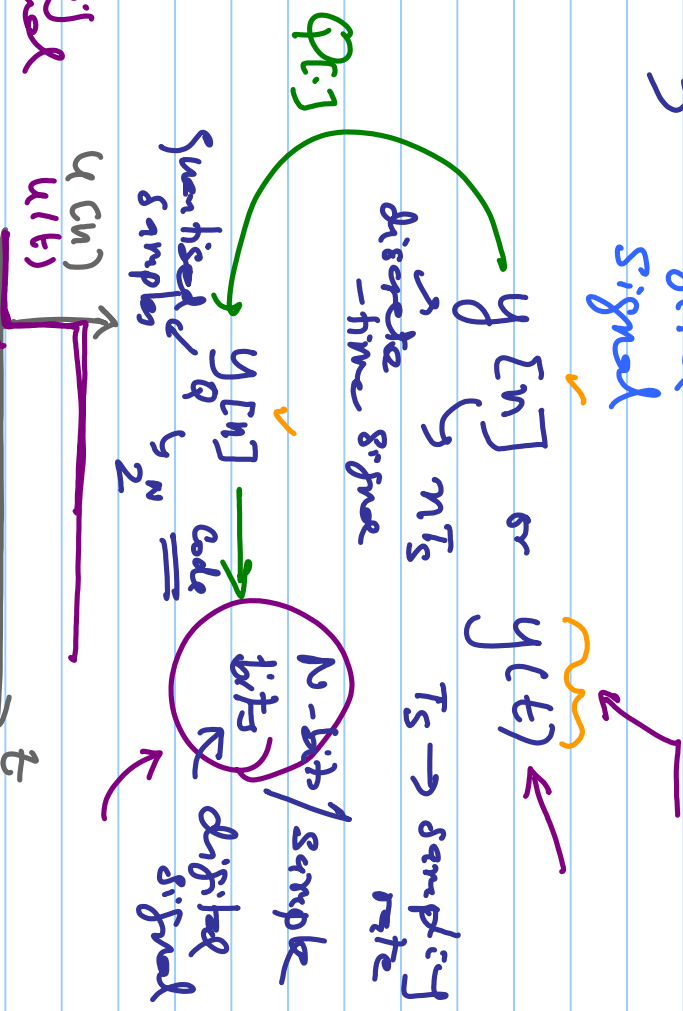
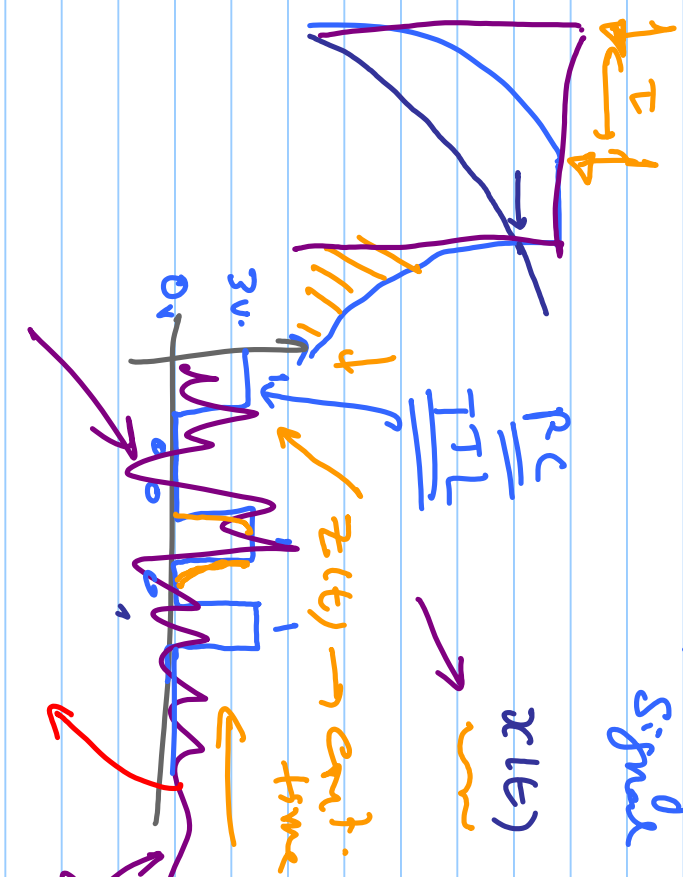


Lesson #1

✓ Analog Signal



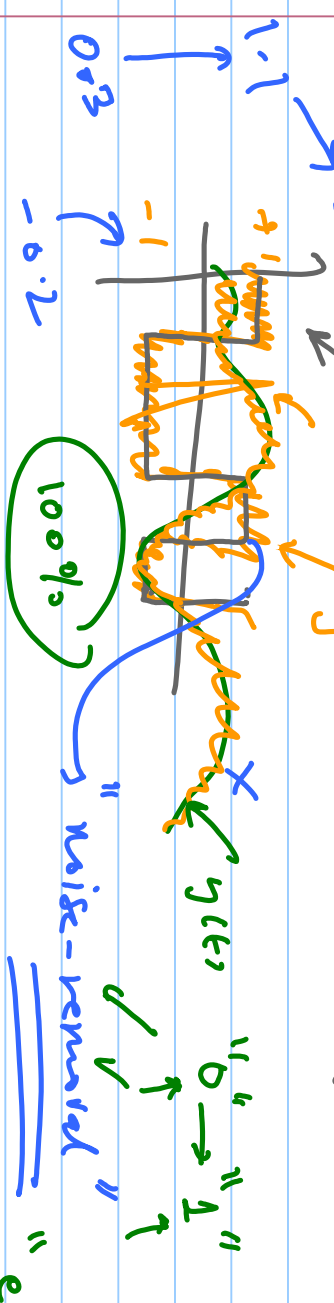
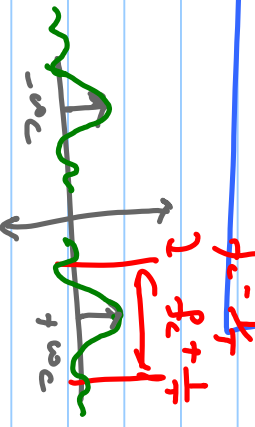
✓ Digital Signal



Analog vs Digital

$$y(t) = x(t) + n(t)$$

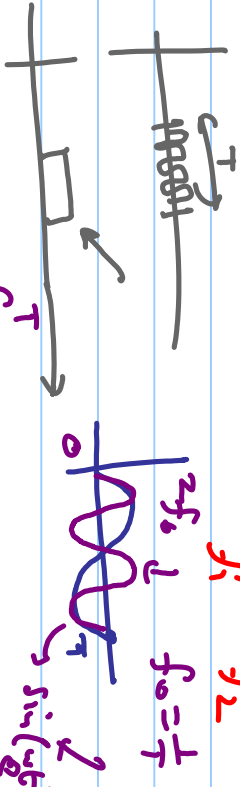
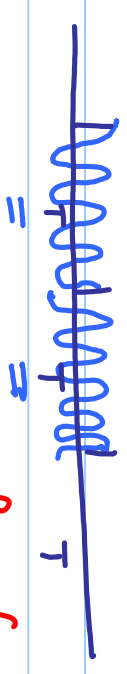
$x(t)$ $n(t)$ noise



- Amplitude
- phase
- freq.

$$A \cos(\omega t + \phi)$$

$\omega = 2\pi f_c$
 ϕ

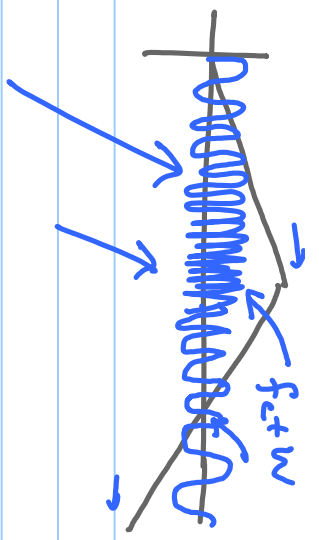


$F_{avg} = \int_0^T |g_1(t)| g_2(t) dt$
 error correction

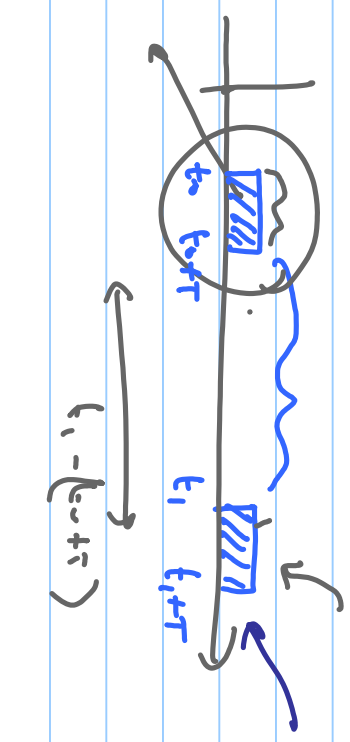
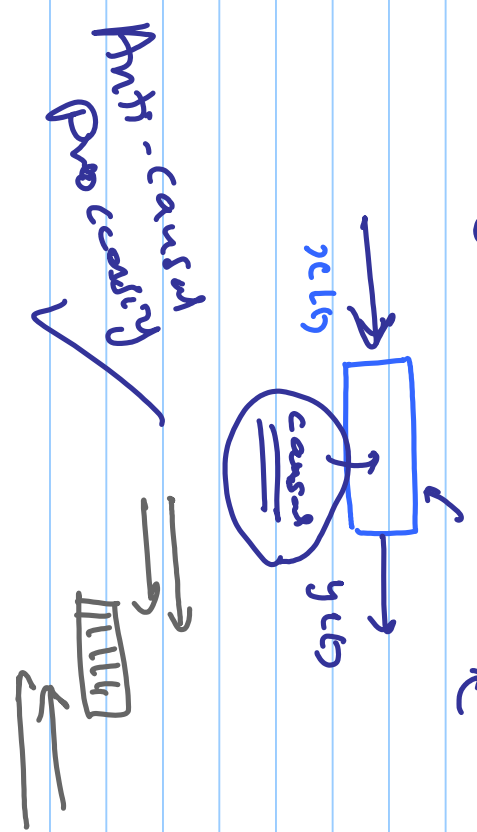
(*)

$$y(n) = \alpha_0 x(n) + \alpha_1 x(n-1) \leftarrow \text{causal}$$

$$y(n) = \alpha_0 x(n) + \alpha_1 x(n+1) \leftarrow \text{non-causal}$$



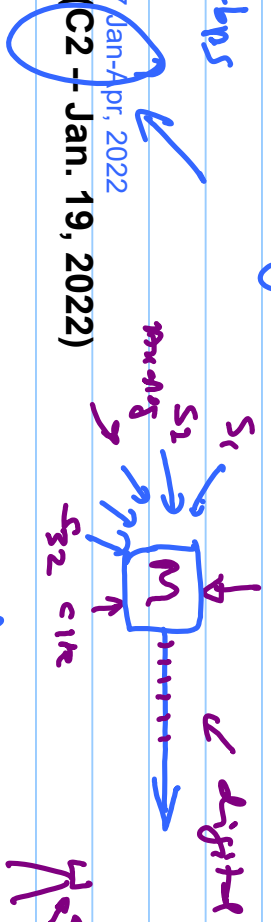
"Real-Time" process



(*) In Digital comm \rightarrow Time Multiplexing is possible (of different info. streams)

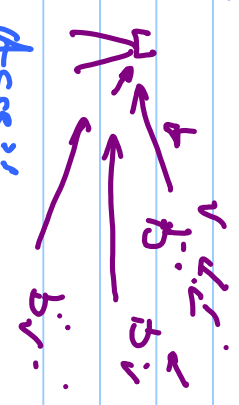
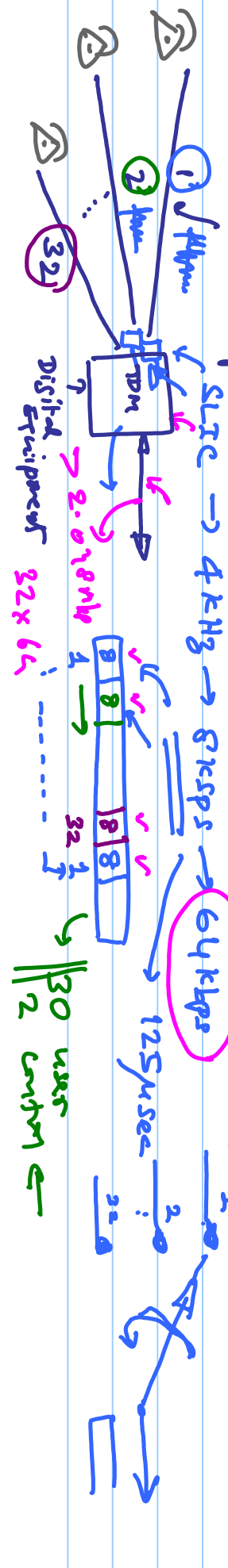
2 Mbps \rightarrow 32 x 64 kbps

EE3007 Jan-Apr, 2022
Lesson #1 (C2 - Jan. 19, 2022)

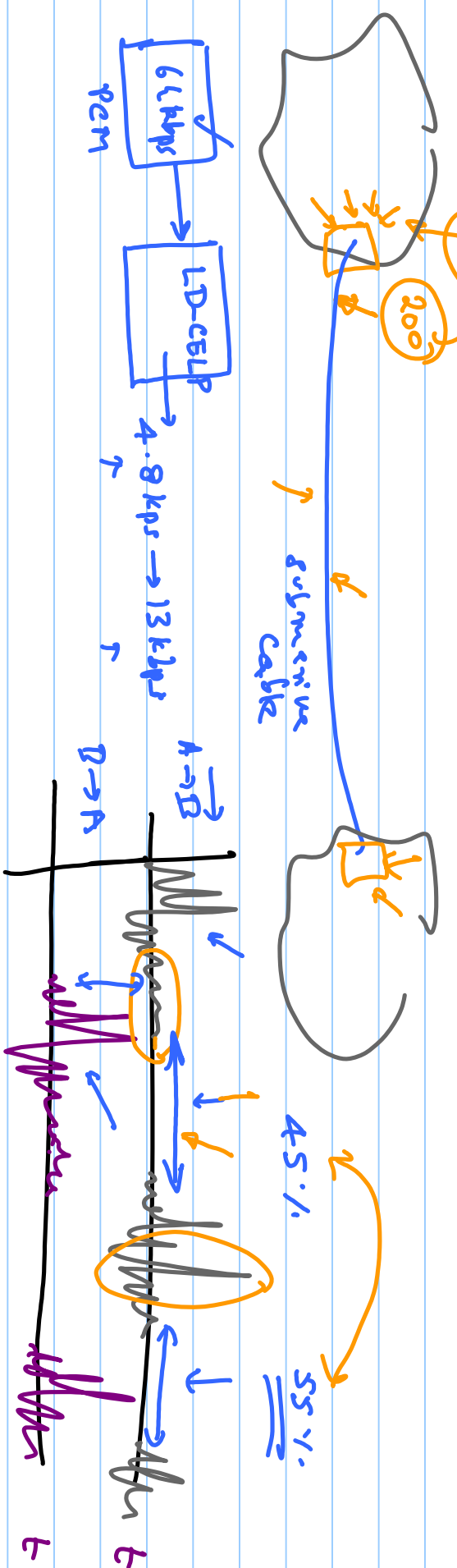


Time Multiplexing \rightarrow TDM \rightarrow TDMA

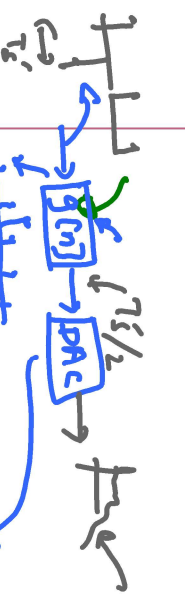
RLU/RSU Local loop



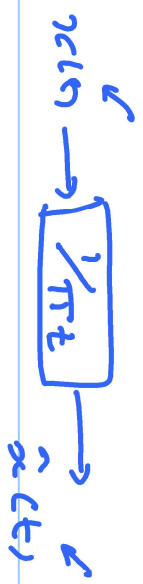
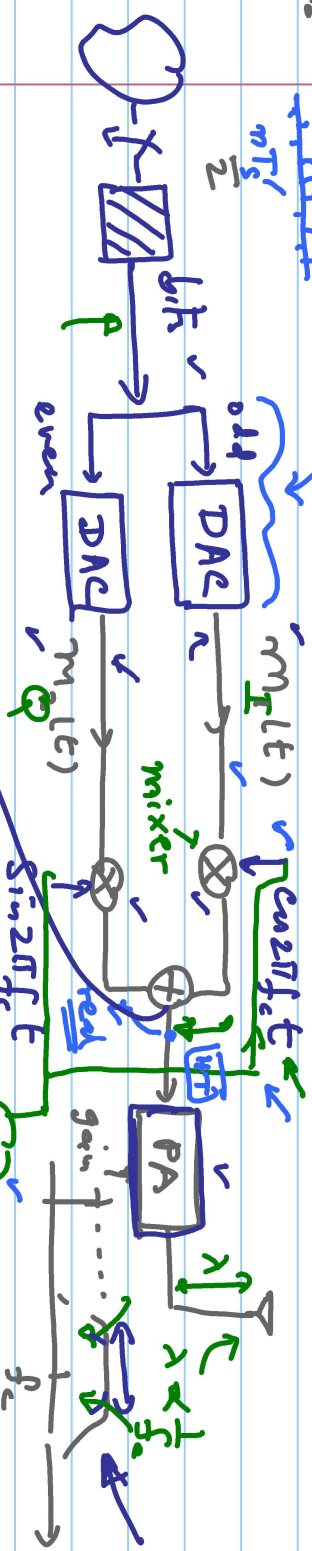
"Statistical Muxing"



"Source Compression"
"Signal"



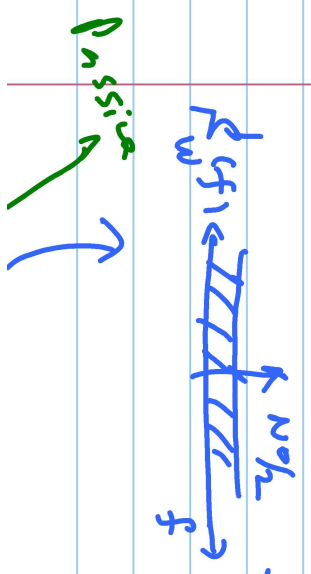
EE3007 Jan-Apr, 2022
Lesson #1 (C3 -- Jan. 24, 2022)



1% distortion
noise

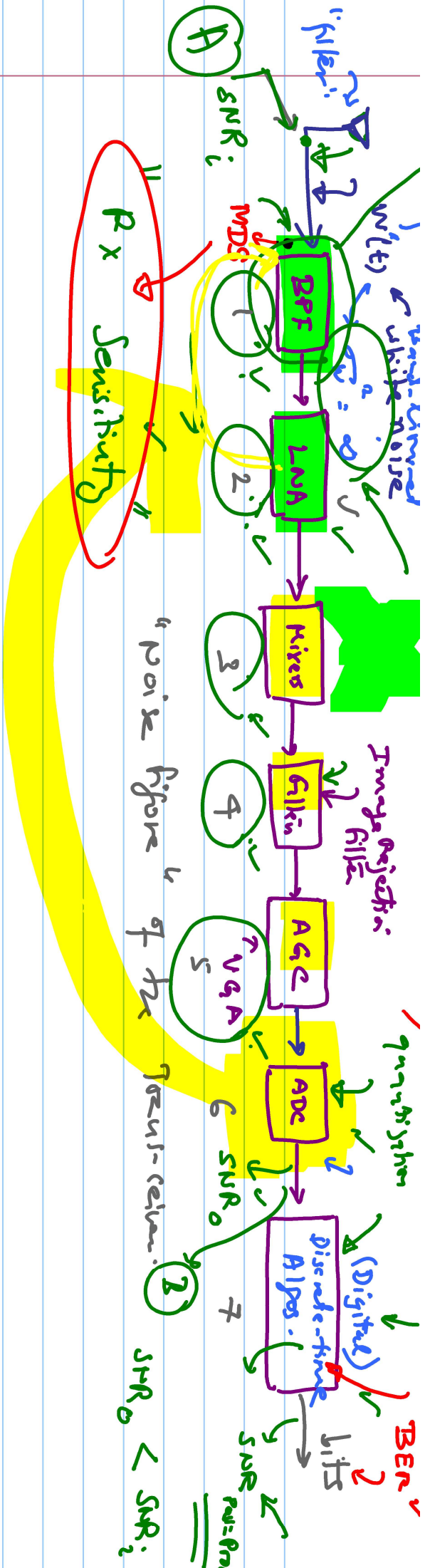
$m_2(t) \cos(2\pi f_c t) + m \phi(t) \sin(2\pi f_c t)$
 → Poise figure → R_x Volterra series
 DPFD
 Gaussian approx.
 of \leq band-pass signal

$$R_{AV}(z) = \frac{v_0}{2} \cdot \text{SCT}$$



Rx Chain

-93 dBm
 -91 dBm
 -5
 10.7



End of Lesson #1