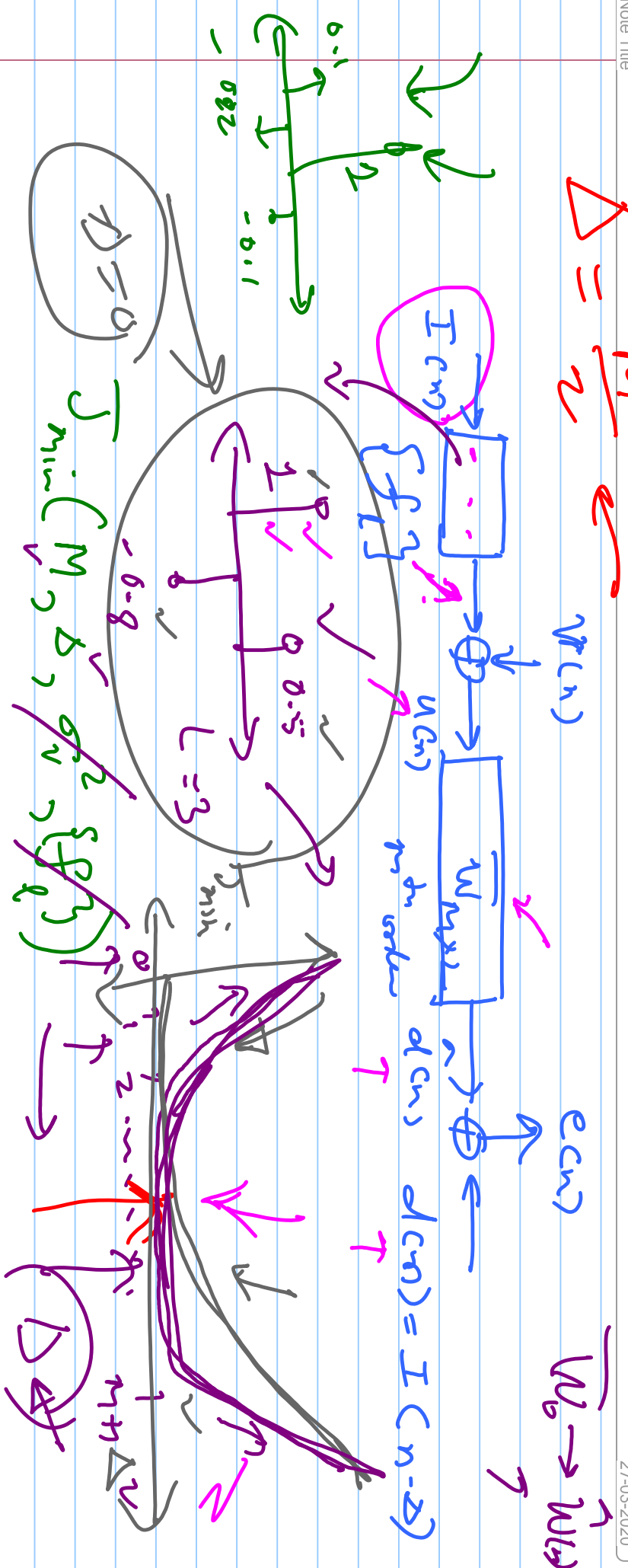
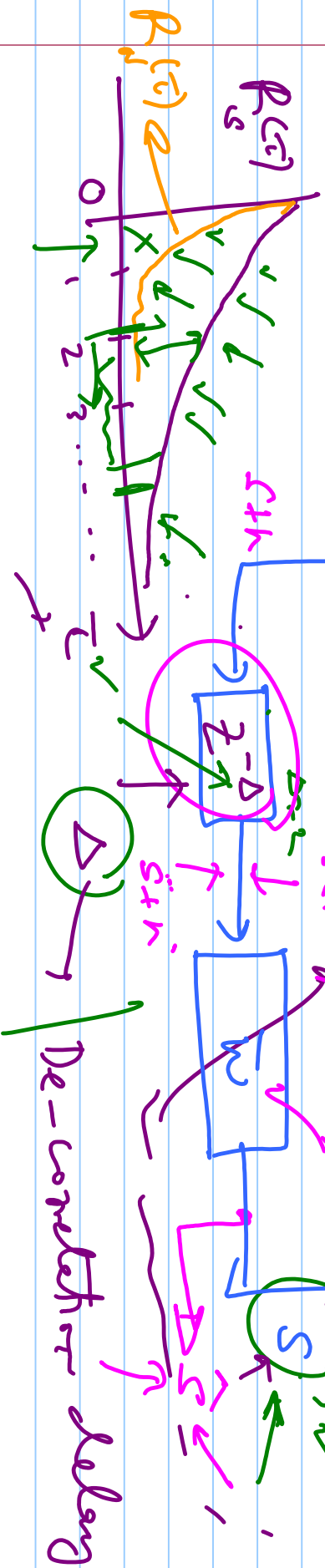
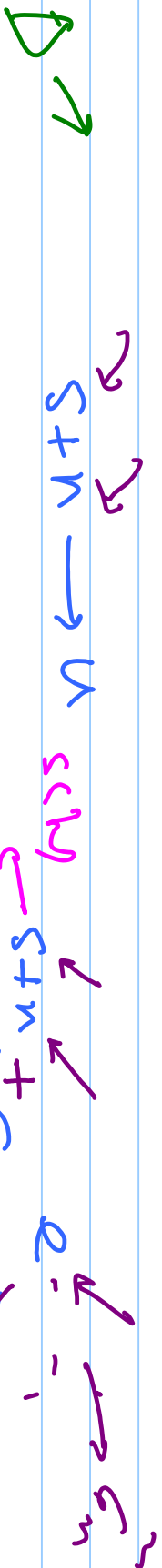


$$\Delta = \frac{M}{2} \leftarrow$$



# Adaptive Noise Enhancer



RLS  $\rightarrow$  E.MSE expression  $\leftarrow$

Converison faster  $\rightarrow$   $e(n)$  and  $\xi(n)$   
 $\checkmark$  4-parameter error  $\checkmark$  2-parameter

$$e(n) = d(n) - \hat{w}^H(n) u(n) \quad \left| \quad \xi(n) = d(n) - \hat{w}^H(n-1) u(n) \right.$$

$$\rightarrow \left( \hat{w}^H(n-1) + k(n) \xi^*(n) \right)^H \left( d(n) - \hat{w}^H(n-1) u(n) \right) - k(n) \xi(n) u(n)$$

$\xi(n)$

$$e(n) = \sum(n) [1 - k^H(n) \bar{u}(n)] ;$$

Commissio  
 fofofof  

$$y(n) = \frac{e(n)}{\sum(n)} = 1 - k^H(n) \bar{u}(n) ;$$

(\*) Recursion for  $\sum(n)$

$$e(n) \stackrel{\text{min}}{=} \sum_{m=1}^n e_d(m)$$

$$e_d(n) = \sum_{i=1}^n \lambda^{n-i} |d(i)|^2$$

$$\lambda e_d(n-1) + u(n) d^*(n)$$

$$w(n-1) + k u(n) \sum_{i=1}^{n-1} \lambda^{n-i} |d(i)|^2 = \lambda \sum_{i=1}^{n-1} \lambda^{n-i} |d(i)|^2 + |d(n)|^2$$

exp. weighted RIS

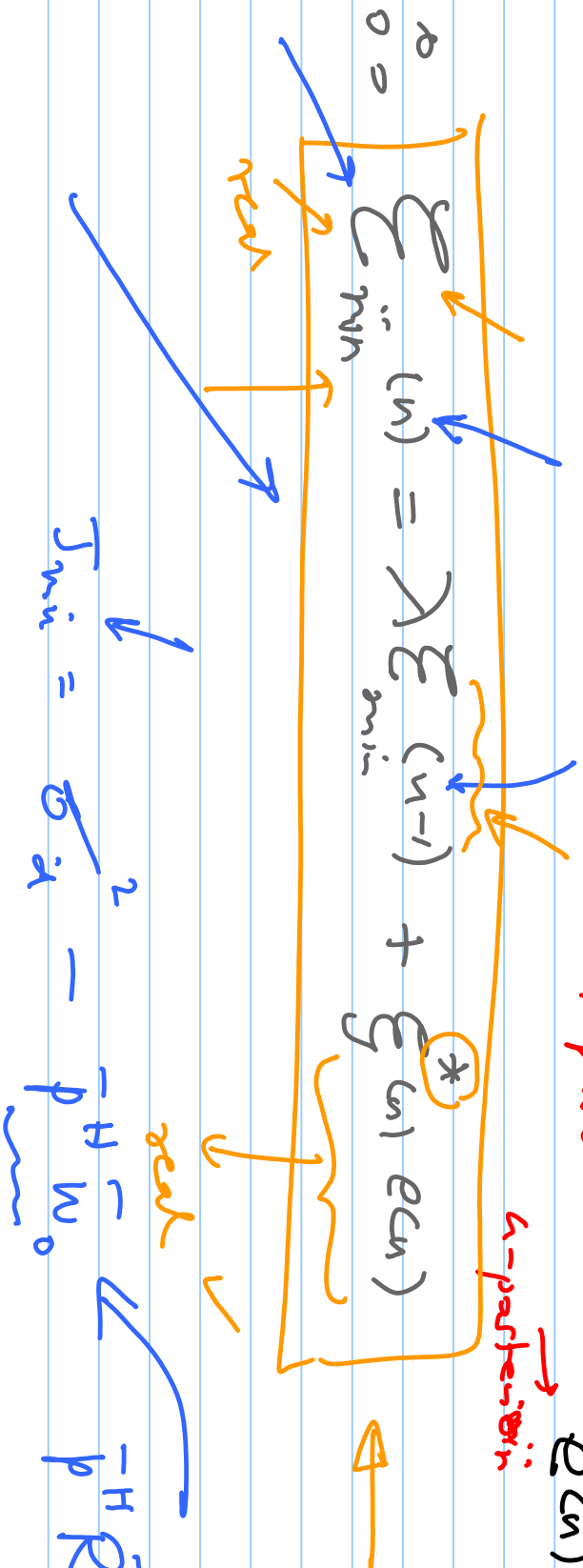
LMS

$\sum_{i=1}^n \lambda^{n-i} |d(i)|^2$

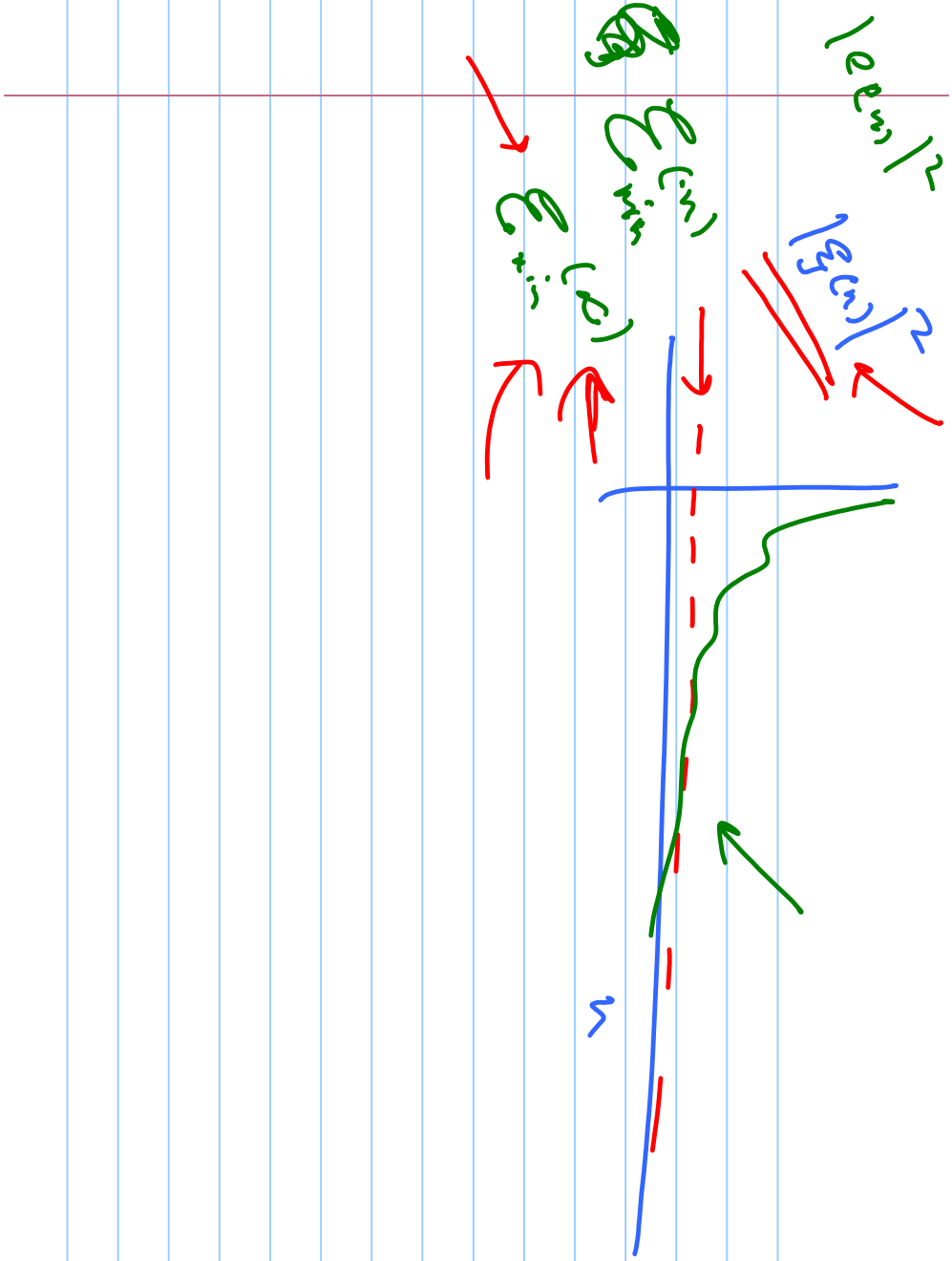
$\sum_{i=1}^n \lambda^{n-i} |d(i)|^2$

$$\begin{aligned}
 \xi_{\min}^{(n)} &= \lambda \xi_d^{(n-1)} + |d^{(n)}|^2 - \lambda \bar{z}^{H(n-1)} w^{(n-1)} + \bar{z}^{H(n)} h_{n1} \xi^{*(n)} + d^{(n)} - \bar{v}^{H(n)} w^{(n-1)} \\
 &= \lambda \left[ \underbrace{\xi_d^{(n-1)}}_{\xi_{\min}^{(n-1)}} - \bar{z}^{H(n-1)} w^{(n-1)} \right] + d^{(n)} + \underbrace{\bar{z}^{H(n)} h_{n1} \xi^{*(n)}}_{\xi^{*(n)}} + d^{(n)} - \bar{v}^{H(n)} w^{(n-1)} \\
 &= \underbrace{P(n) u(n)}_{P(n) = P(n)^H} - \underbrace{\left( P(n) \bar{z}^{(n)} \right)^H}_{\bar{w}^{H(n)}} \bar{u}(n) \xi^{*(n)}
 \end{aligned}$$

$$\sum_{\text{min}} c_n = \lambda \sum_{\text{min}} c_{n-1} + \sum_{\text{min}}^* c_n \cdot \left[ d_{c_n} - w_{c_n} \bar{u}_{c_n} \right]$$



$$J_{\text{min}} = \sigma_{\text{ix}}^2 - p_{\text{H}} \bar{w}_0 \leftarrow p_{\text{R}} \bar{p}$$



RMSE





