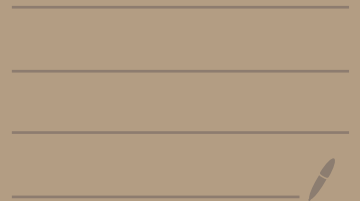


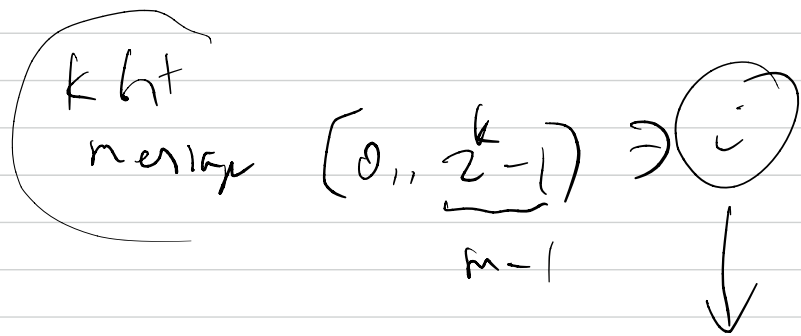
Principles of Digital Communication

May 26, 2021

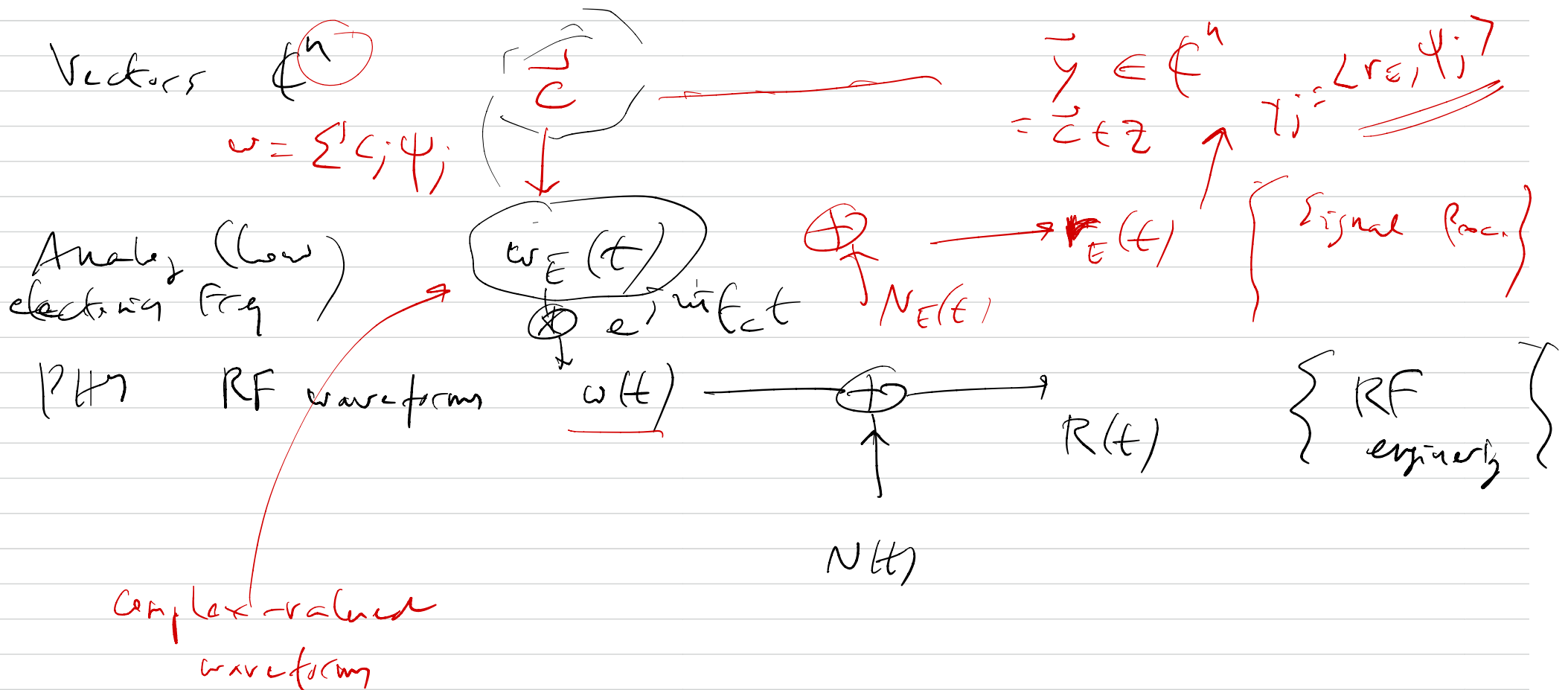


Overview of the semester,

- Modular design:



ML/MA? decoder $\hat{i} = \underset{i}{\operatorname{argmin}} \|e_i - y\|$



Chapter 2:

$$\begin{array}{c} \underline{\underline{i}} \longrightarrow y \\ \underline{p_H(i)} \quad \quad \underline{p(y|i)} \quad \dots \quad \underline{p(i|y)} \end{array}$$

Chapter 2 still

$$y = C_i + z \quad \text{case.}$$

Chapter 3: waveforms $C_i \xrightarrow{??} w_i$

"Modularity for free":

$$\underline{i \longrightarrow w_i(t)}$$

pick an orthonormal basis for $\text{span}\{w_1, \dots, w_m\}$
(eg via Gram-S.) $\psi_1, \dots, \psi_j$ s. that

$$w_i = \sum_j C_{ij} \psi_j$$

$$\Rightarrow i \longrightarrow \underbrace{C_i}_{\in n\text{-dim.}} \longrightarrow w_i$$

Chapter 3: waveforms, matched filter, ...

Chapter 4: "meaning of" dimension n as $BW \times \text{Duration}$,
intuition about $\underline{k}$ vs $\underline{n}$ vs $\underline{\Sigma}$

Chapter 5: Nyquist criterion so that $\psi_1, \dots, \psi_n$
can be time-shifts of each other, P.S.D.

Chapt 6 : " $\bar{c} \rightarrow c_{\bar{c}}$ " clearly -
[Conv. coder, Viterbi decoder]

Chapt 7 : 