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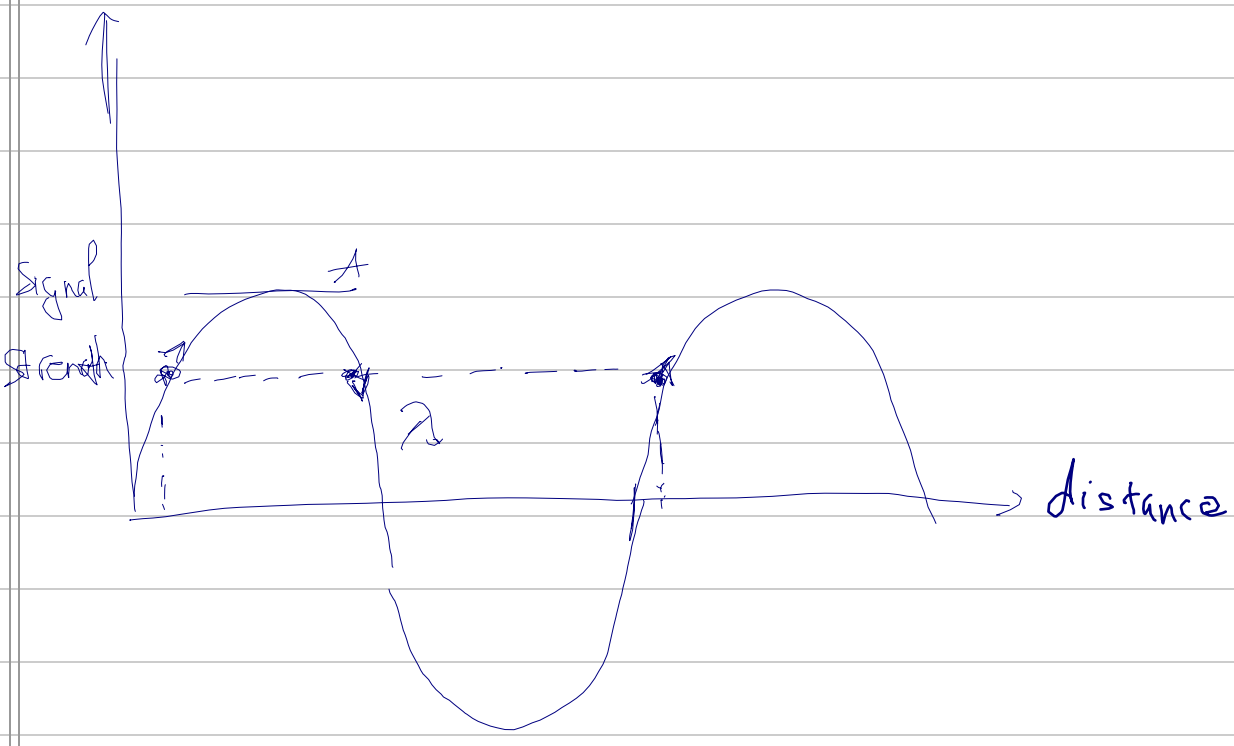
Book: Data & Communication, 10th Ed.
William Stallings

- Digital signal has defined levels (F3.1)
- Sinwave $v(t) = A \sin(2\pi f t + \phi)$
  - f: freq
  - t: time
  - A: amplitude, max value of amplitude the v(t) can take.

$$v(t) = A\sin(2\pi + 2\pi f t + \phi)$$
$$= A\sin\left(2\pi f\left(t + \frac{1}{f}\right) + \phi\right)$$
$$= A\sin\left(2\pi f(t+T) + \phi\right) \Rightarrow T = \frac{1}{f}.$$
$$= A\sin(wt + \phi) \qquad \boxed{w = 2\pi f}$$

phase



C440
May 28th
2015

Digital transceiver: converts from 1 digital logic to another logic (voltage, etc.), or act as a repeater.
(Fig 3.13)

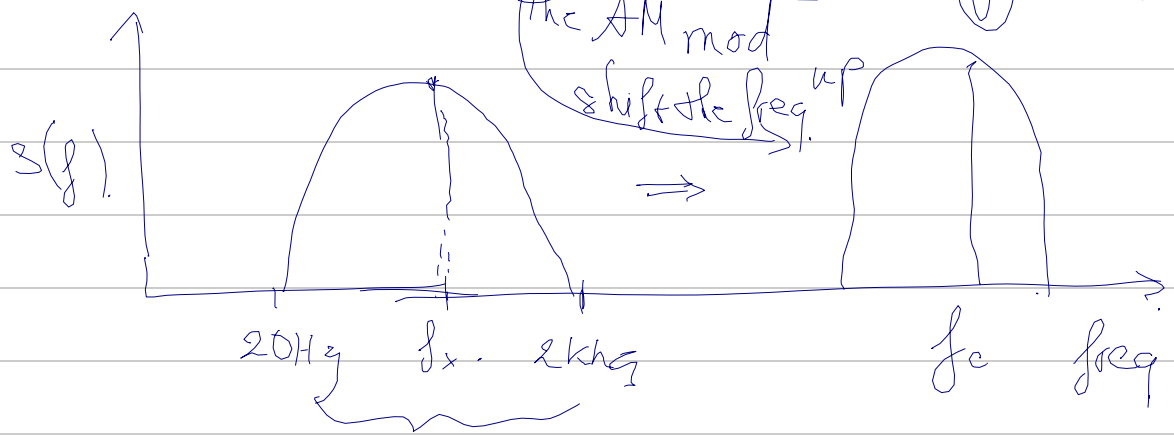
	Analog Signal
Analog data	(1) singing through mic in the concert (2) the radio tower mod/demod.

LPF: truncate the high freq.

Sound → Mic → Signal Modulator → Antenna ..... Antenna → Signal demodulator

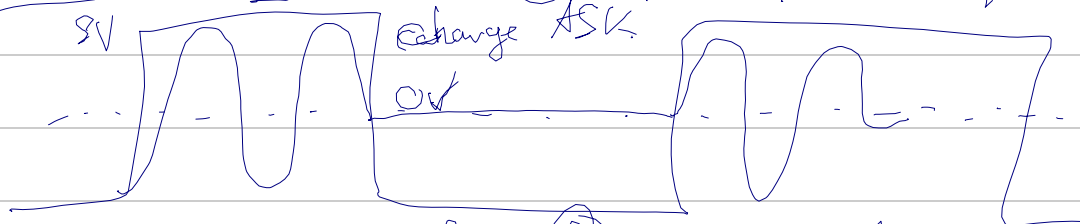
$A_c \sin(2\pi f_c t + \phi)$

the AM mod shift the freq up ⇒

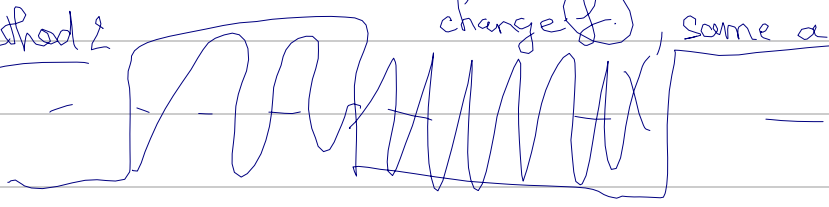


- humanly hearable
- reduce pois
- small antenna

Method 1 — 1 f=3.3KHz ② Amplitude 1, same freq, same phase



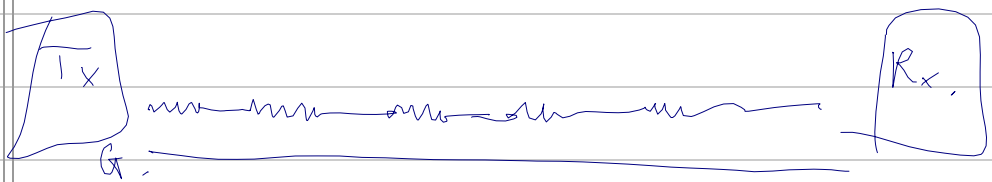
Method 2 — change f, same amplitude, same phase



Method 3 phase is changed., same amplitude, same freq.

Asynchronous : example : internet.
Synchronous example : TCP/IP

Attenuation:



Prob
- going thru a list of capacitor reduce signal strength
- high freq becomes low freqs.
- low — does not reach the Rx or lower than noise signal.

Sol Use amplifier / equalizer

testing 123

low freq got less amplification
high freq got more amplification.

White noise : multiple freqs combined.

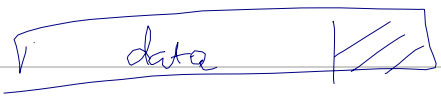
Stop at Categories of Noise.

pmp 2wfg

class code. qsizmzc.

quiz next of next week

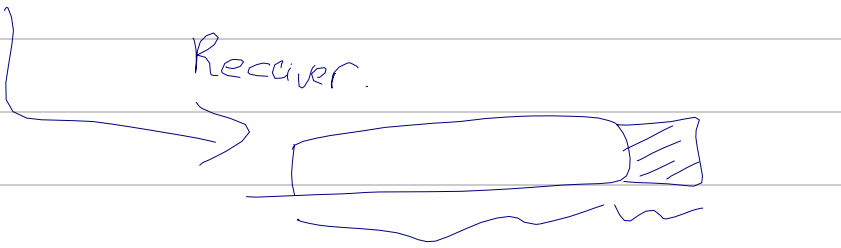
Sun 11th



Sender

n-k bit (E = f(data))

— generate checksum.



regenerate E & compare with the sender's E

Parity Check:

Data	Parity(even) → counting number of 1s in the data.
1101	1.
0011	0.
0000	0.

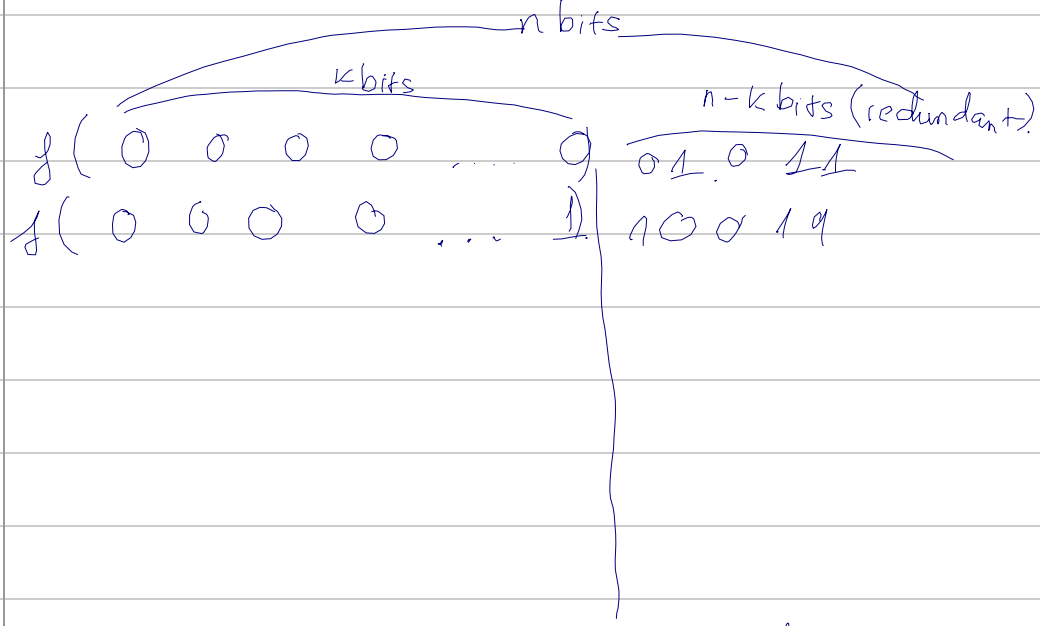
even - even : 0

odd - odd : 0

otherwise : 1

Can't detect if 2-4-6-8 bit are inverted.

Data k-bit

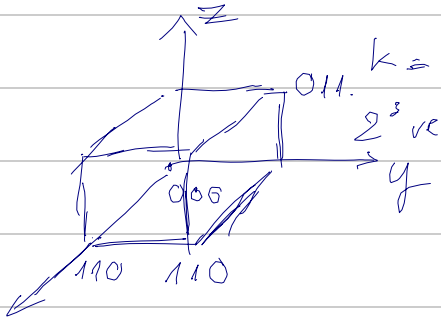


Data Redundant

$E = f(data)$
$E' = f(data')$ if $E \neq E'$ when $Data \neq Data'$

$\forall$ Data

$k = 3$



$k = 3 \Rightarrow 2^3$ vertices

if $k = 3$ each vertice is a msg. 2^k vertices.

if $n \rightarrow 2^n$ vertices

Error detection is always used but error correction is not widely used bec of its complexity in implementation & does not guarantee if the correction is 100% successful.