Assignment #1- ENEL 573

Thursday, September 24, 2015 9:55 PM

Question #1:

4-bit

p	p	p	p

p - probability of bit being correct. (single bit)

* - sent over a noisy link ← presence of noise

  ↳ Assume Gaussian Noise (AWGN)

- distribution of noise will be gaussian, then assuming that the mean of noise is $\underline{\underline{\emptyset}}$ and the standard deviation $\underline{\underline{\sigma}}$, which can be set for the example but for now leave it.

$$AWGN \equiv \eta = \langle \text{enter Gaussian Distribution} \rangle$$

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a) Find the probability that the the first + last bits are correct and the middle two bits are in error:

✓	×	×	✓

$$P_{\checkmark\times\times\checkmark} = P(1-P)(1-P)(P)$$

$$p^2(1-p)^2$$

$$\boxed{P = (0.5 + AWGN)}$$

$$= 0.5 + \eta \leftarrow \begin{matrix}\text{mean } \emptyset \\ \text{std.dev } \sigma\end{matrix}$$

Look into?

B)

Todo: — Look up frame errors
- bit/Byte stuffing
- OSI level
- Noise + bit errors
- Review his probability

By tomorrow Night!

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b) N - bits $p =$ Prob error K - error bits

$$P = \binom{N}{K} p^K (1-p)^{N-K}$$

c)

$$P = \sum_{i=1}^{N} \binom{N}{i} p^i (1-p)^{N-i}$$

d) $p = 0.0001$ $N_1 = 500$ $N_2 = 1000$

$$P_1 = \sum_{i=1}^{N_1} \binom{N_1}{i} p^i (1-p)^{N_1-i}$$

$$= \sum_{i=1}^{500} \binom{500}{i} (0.0001)^i (0.9999)^{(500-i)}$$

$$= \text{Binomial Expression} = \boxed{1 - \underbrace{(1-p)^N}}$$

total prob. No error present.

e)

Reverse D – (check against 100bits)

2 – unit conversions + Arithmetic

3 – a) P_F = frame error   N-bits

p = bit error

$$\sum_{k=1}^{\infty} kp^k = p/(1-p)^2$$

$p \equiv P_F$?

b) enter values

c) calculation Arithmetic

4) Look up CRC's (escape char)

5) $P = \binom{5}{3}(0.5)^3(0.5)^2$

clusters ← combinatorics

5!

32 – (3) – (2) – (1)