القـــــسم الـكهربي

كلية الهندسة / جامعة مصراته
الامتحان النهائي/ (اتصالات 2)

الزمن: ساعتان ونصف
تاريخ الامتحان/ 2014-02-01

أجب عن جميع الاسئلة
ملاحظة ((BW of M-ary raised cosine=R/2m (1+α)

السؤال الأول (12 درجات)

Explain briefly:

DPCM E_1 standard Equalizer ISI Spread spectrum

السؤال الثاني (12 درجات)

1. Analog signal has bandwidth 8k Hz is sampled at rate 20k Hz, each sample are quantized to 256 level. The quantizer output is coded into M-ary. Finally the output coder reshape by raised cosine roll off (α=0.5). The channel that carries the date has bandwidth 24k Hz. Determine the smallest acceptable value of M-ary.

2. The samples of the signal pulse at the output of certain channel are -0.2, 0.3, -0.3, 1,-0.2, 0.2, 0.06. Find the coefficient of adaptive taped equalizer that will force one zero on the right and left of the centre. Then Find the output of equalizer?

السؤال الثالث (12 درجات)

1. Assuming a BPSK signal transmitted through a channel which has noise $N_0= 10^{-11}$ watt/Hz. Find the amplitude A_c of the received carrier signal that achieve the probability of error 10^{-6} for the following data rate.
   - Input rate = 1k bit/sec
   - Input rate = 10k bit/sec

3. 4800 bit/sec data terminal is connected to the modulator calculate the transmission bandwidth required to each of the following scheme (50% roll off using for each case)

- OOK
- FSK where the frequency deviation ±3600 Hz.

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السؤال الرابع (12 درجات)

1. Compare between modulation scheme PSK and DPSK.
2. Why we prefer the PSK in satellite communication compared with FSK and ASK.
3. The $N_0=10^{-8}$ calculate the energy per bit for DPSK. if the probability per bit is 10^{-6}.

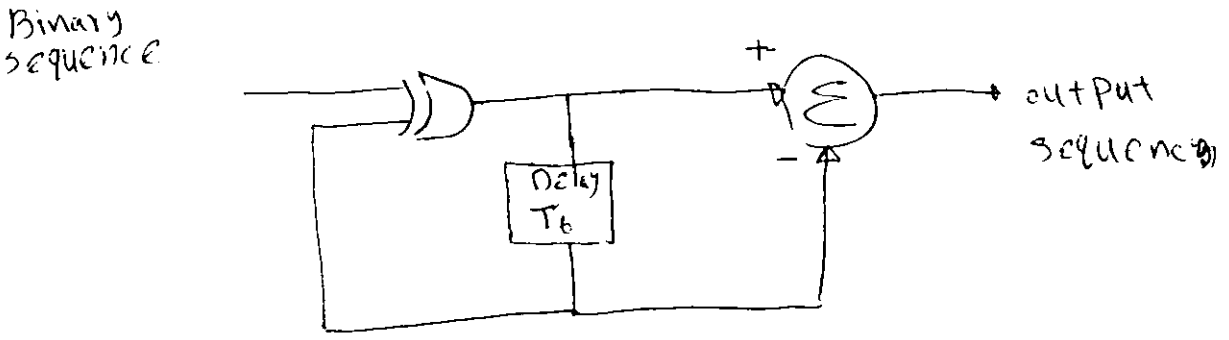
FSK signal has frequencies 10k Hz and 100k Hz. higher frequency used to transmitted the one. The channel added noise has $N_0=$ and bit rate=35k bit/sec.

1. Write the expression of the signal
2. Find the required transmission bandwidth.
3. Find the signal power if the error probability is 0.1977.

السؤال الخامس (12 درجات)

1. The binary sequence 1 0 0 1 0 1 0 0 1 0 0 modulated by DPSK sketch the waveform at transmitter output

2. Show that the following block diagram may be used to convert the NRZ into Bipolar for this sequence 0 1 0 0 0 0 1 1 0



مع تمنياتنا بالنجاح

$$Q(z) = \frac{1}{\sqrt{2\pi}} \int_{z}^{\infty} e^{-x^2/2}\, dA$$

$$Q(z) = \frac{1}{2} Q(-z) = 1 - Q(z) \qquad z \geq 0$$

$$Q(z) = \frac{1}{2} - \mathrm{erf}(z)$$

$$\mathrm{erf}(z) = \frac{1}{\sqrt{2\pi}} \int_{0}^{z} e^{-A^2/2}\, dA$$

$$Q(z) = \frac{1}{\sqrt{2\pi z}} e^{-z^2/2} \qquad z >> (z > 4)$$

z	Q(z)	z	Q(z)	z	Q(z)	z	Q(z)
0.00	0.5000	1.00	0.1587	2.00	0.0228	3.00	0.00135
0.05	0.4801	1.05	0.1469	2.05	0.0202	3.05	0.00114
0.10	0.4602	1.10	0.1357	2.10	0.0179	3.10	0.00097
0.15	0.4404	1.15	0.1251	2.15	0.0158	3.15	0.00082
0.20	0.4207	1.20	0.1151	2.20	0.0139	3.20	0.00069
0.25	0.4013	1.25	0.1056	2.25	0.0122	3.25	0.00058
0.30	0.3821	1.30	0.0968	2.30	0.0107	3.30	0.00048
0.35	0.3632	1.35	0.0885	2.35	0.0094	3.35	0.00040
0.40	0.3446	1.40	0.0808	2.40	0.0082	3.40	0.00034
0.45	0.3264	1.45	0.0735	2.45	0.0071	3.45	0.00028
0.50	0.3085	1.50	0.0668	2.50	0.0062	3.50	0.00023
0.55	0.2912	1.55	0.0606	2.55	0.0054	3.55	0.00019
0.60	0.2743	1.60	0.0548	2.60	0.0047	3.60	0.00016
0.65	0.2578	1.65	0.0495	2.65	0.0040	3.65	0.00013
0.70	0.2420	1.70	0.0446	2.70	0.0035	3.70	0.00011
0.75	0.2266	1.75	0.0401	2.75	0.0030	3.75	0.00009
0.80	0.2169	1.80	0.0359	2.80	0.0026	3.80	0.00007
0.85	0.1977	1.85	0.0322	2.85	0.0022	3.85	0.00006
0.90	0.1841	1.90	0.0287	2.90	0.0019	3.90	0.00005
0.95	0.1711	1.95	0.0256	2.95	0.0016	3.95	0.00004
						4.00	0.0003
						4.25	10^{-5}
						4.75	10^{-6}
						5.20	10^{-7}
						5.60	10^{-8}