edX **HKUSTx: ELEC1200.2x A System View of Communications: From Signals to...**

9.1 QUIZ QUESTION 1 (1/1 point)

Consider the following implementation of Binary Phase Shift Keying (BPSK): A bit sequence is transmitted by first converting it into a waveform that is equal to +A for one bit period when the bit is 1 and -A for one bit period when the bit is 0, and then this waveform is multipled by a sinusoidal carrier?

Which of the following is/are true about this particular implementation of BPSK?

☐ It transmits digital information by varying the frequency of the sinusoidal carrier between two values.

☑ It transmits digital information by changing the amplitude of the sinusoidal carrier between two values. ✔

☑ It transmits digital information by changing the phase of the sinusoidal carrier between two values. ✔

☐ It transmits digital information by varying the period of the sinusoidal carrier between two values.

✔

Note: Make sure you select all of the correct options—there may be more than one!

EXPLANATION

There are two possible ways to interpret this particular implementation of binary phase shift keying. One is as amplitude modulation, where the amplitude of the carrier is either +A or -A during each bit period depending upon whether the bit being transmitted is 1 or 0. Since $-A\cos(2\pi ft) = A\cos(2\pi ft + \pi)$, this can also be interpreted as phase modulation, where the phase of the carrier is either 0 or π.

Modulation

However, note that in general, binary phase shift keying cannot be interpreted as amplitude modulation, e.g. in the case when the phase is switched between $+\pi/2$ and $-\pi/2$.

You have used 1 of 1 submissions

9.1 QUIZ QUESTION 2 (1/1 point)

In Binary Phase Shift Keying, intersymbol interference

○ does not occur.

○ is introduced only by the low pass filter used to limit the bandwidth of the transmitted signal.

○ is introduced only by the low pass filter used in the demodulator at the transmitter.

⦿ can be introduced by both the demodulator low pass filter and the transmit filter.   ✔

EXPLANATION

The transmit filter smooths the transitions between +A and -A in the waveform created from the bitstream, introducing intersymbol interference. Ideally, the low pass filter used at the receiver does not introduce additional intersymbol interference, since it should just eliminate frequency components that were not in the modulating signal. However, practical filters do not have the ideal characteristics required to do this, and so will reduce some of the high frequency components in the recovered signals, introducing additional intersymbol interference.

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