Chapters 9.3-9

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Modulation Schemes not Requiring Coherent References

- In this section, now we consider two modulation schemes that you do not need to require the acquisition of a local reference signal in phase coherence with the received carrier.

Differential Phase-Shift Keying (DPSK)

- The implementation of a such a scheme presupposes two things;
  1. The unknown phase perturbation on the signal varies slowly that the phase is constant from one signalling interval to next.
  2. The phase during a given signalling interval bears a known relationship to the phase during the preceding signalling interval bears a known relationship to the phase during the preceding signalling interval.

Table 9.3 Differential Encoding Example

Message sequence:		1	0	0	1	1	1	0	0	0
Encoded sequence:	1	1	0	1	1	1	1	0	1	0
Reference digit:	↑									
Transmitted phase:	0	0	π	0	0	0	0	π	0	π

Differential Encoding Message Sequence

- An arbitrary reference binary digit is being selected as an initial digit of the sequence
- For each digit , the present digit used as a reference
- 0 in the message sequence is encoded as a transition from state of reference digit to the opposite state in the encoded message sequence
- 1 encoded as no change of state

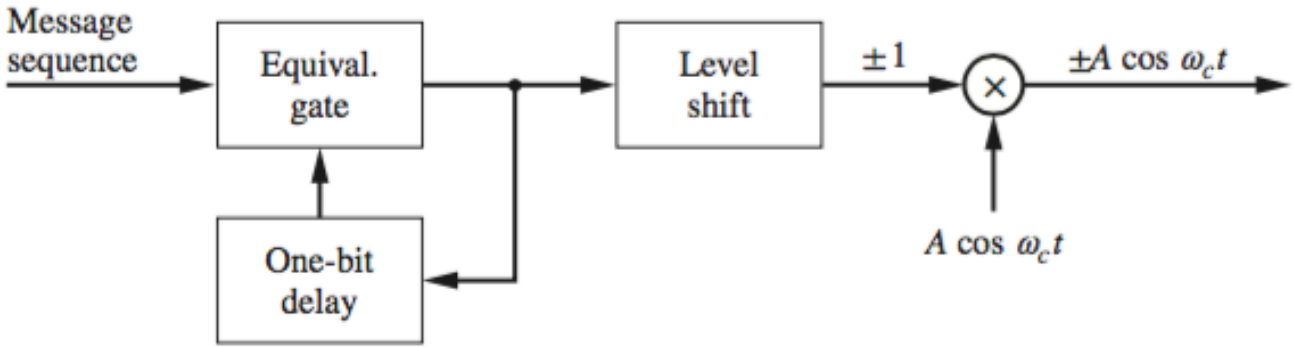

Figure 9.16
Block diagram of a DPSK modulator

Differential Encoding Message Sequence

- Implementation of differentially coherent demodulator is shown in figure 4.
- The reference signal and noise passed through a bandpass filter and then correlated by bit by bit of the signal plus noise.
- After the reference bit and plus the first encoded bit, signal input become $S_1 = A\cos(\omega_c)t$ and $R_1 = A * cos(w_c) * t$
- Than the output correlator is; $v_1 = \int_0^T A^2 \cos^2(\omega_c t)dt$ which eventually become $\frac{1}{2}A^2 T$

Comparison of Digital Modulation Systems

Multipath Interference

Equalization

Equalization by Zero Forcing

Equalization by Minimum Mean-Squared Error

Tap Weight Ajustment (LMS Algorithm)