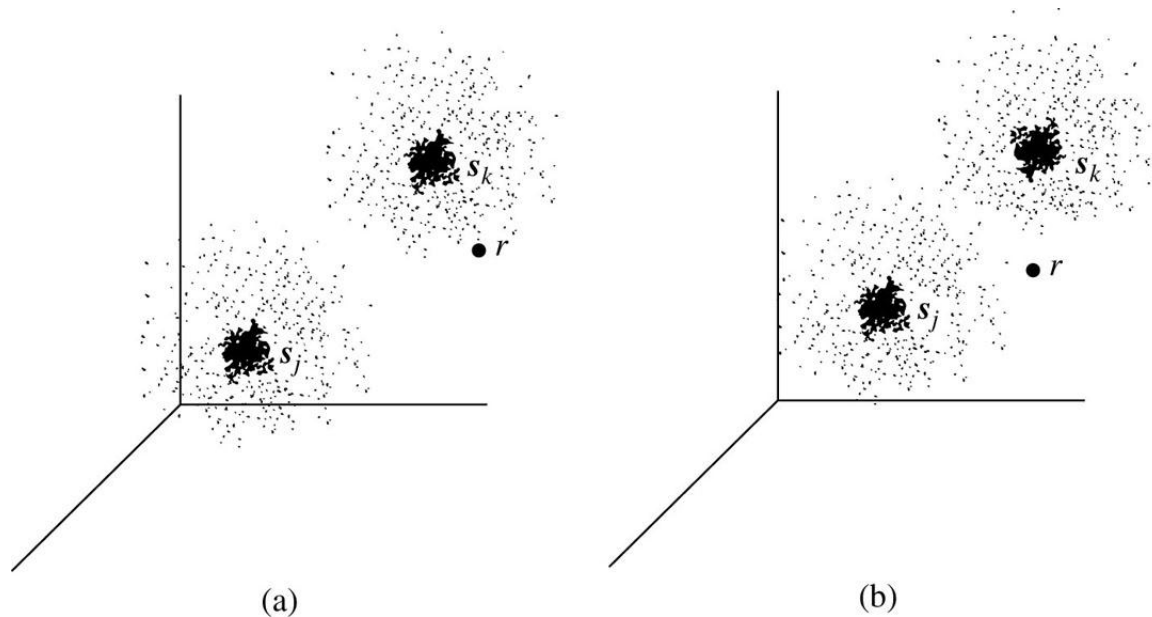
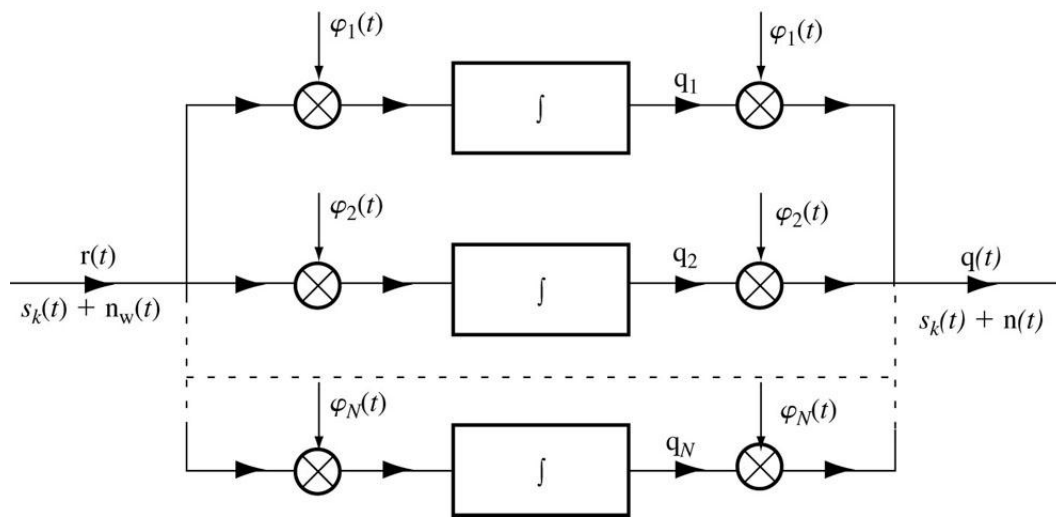


## Optimum Receiver for White Gaussian Noise Channels

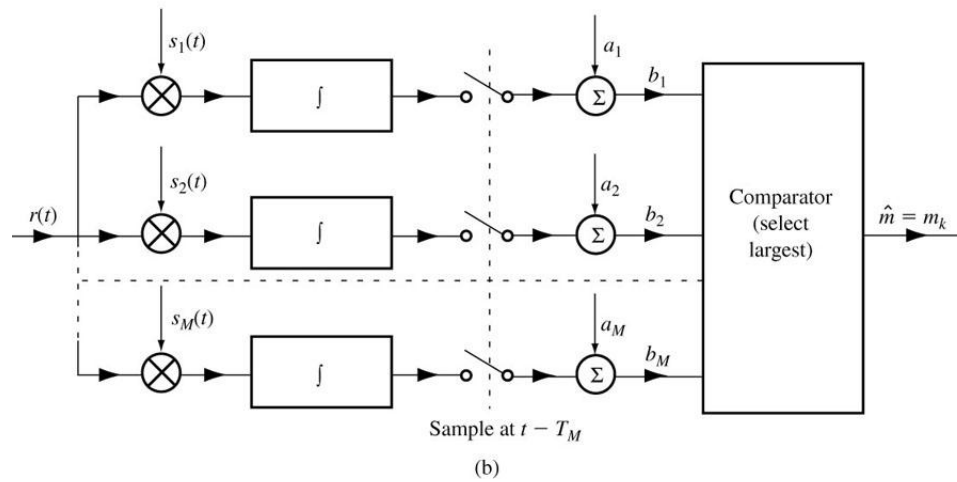
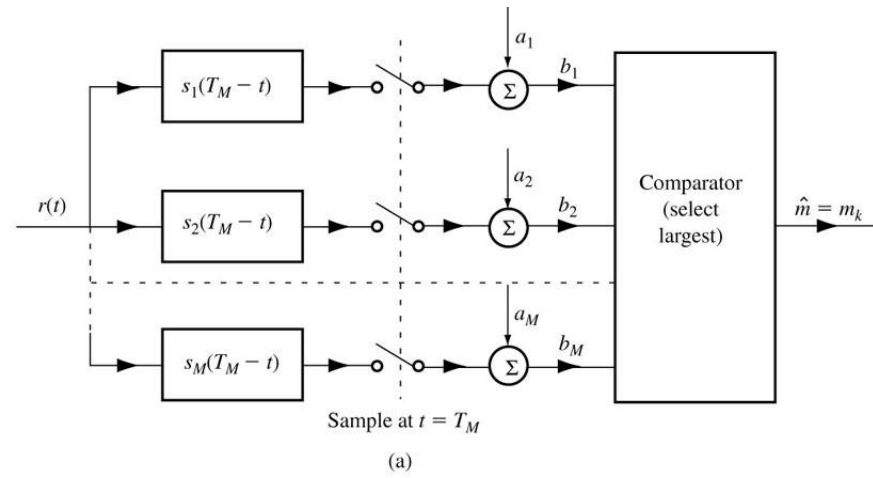


$S_n(w) = N/2$ ,  $r(t) = s_k(t) + n_w(t)$ ,  $r(t)$  is Received signal at receiver, Because of the noise  $n_w(t)$  is white,  $r = s_k + n_w$ , the signal vector  $s_k$

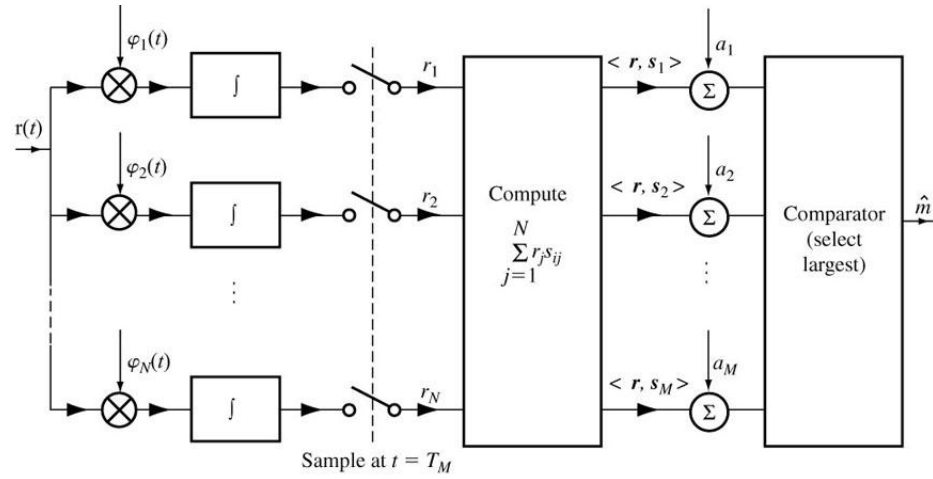
**Figure** Binary communication in the presence of noise.



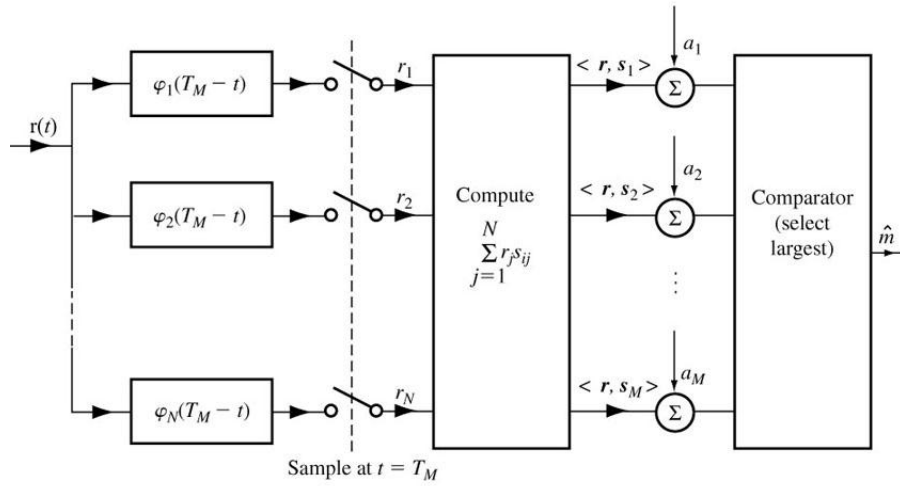
**Figure** Eliminating the noise orthogonal to signal space.



**Figure** Optimum  $M$ -ary receiver: (a) matched filter detector; (b) correlation detector.

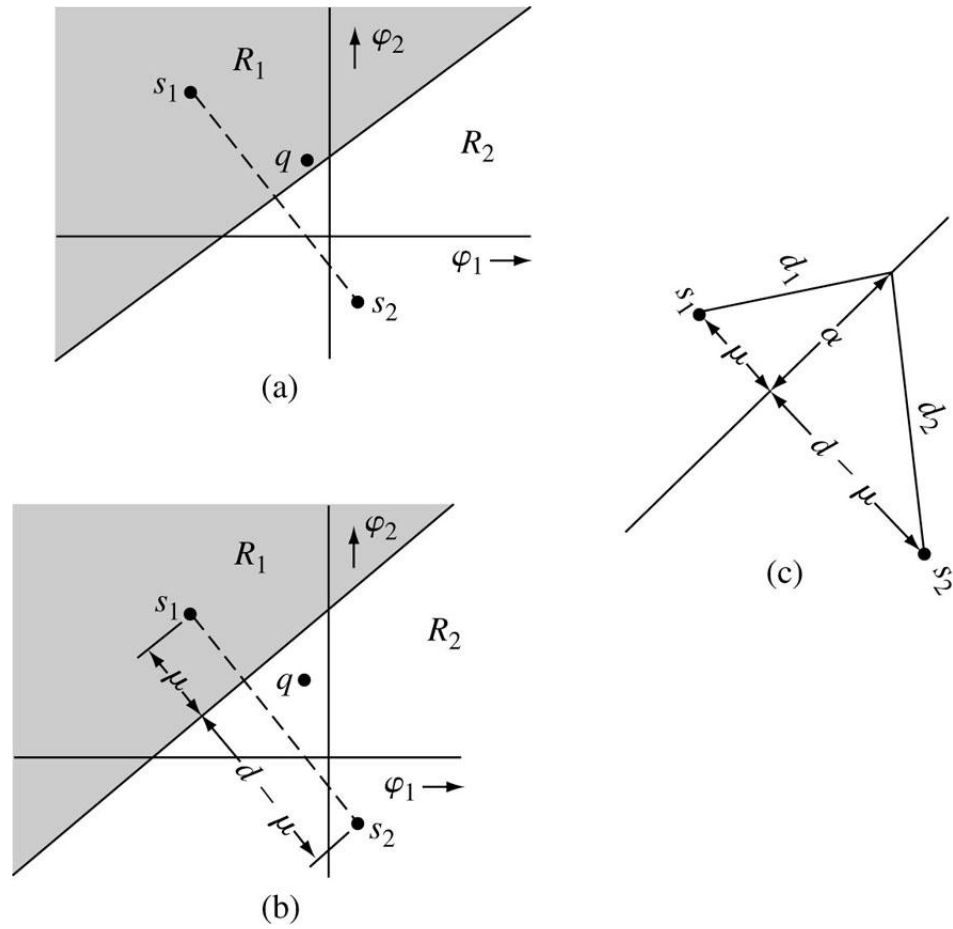


(a)

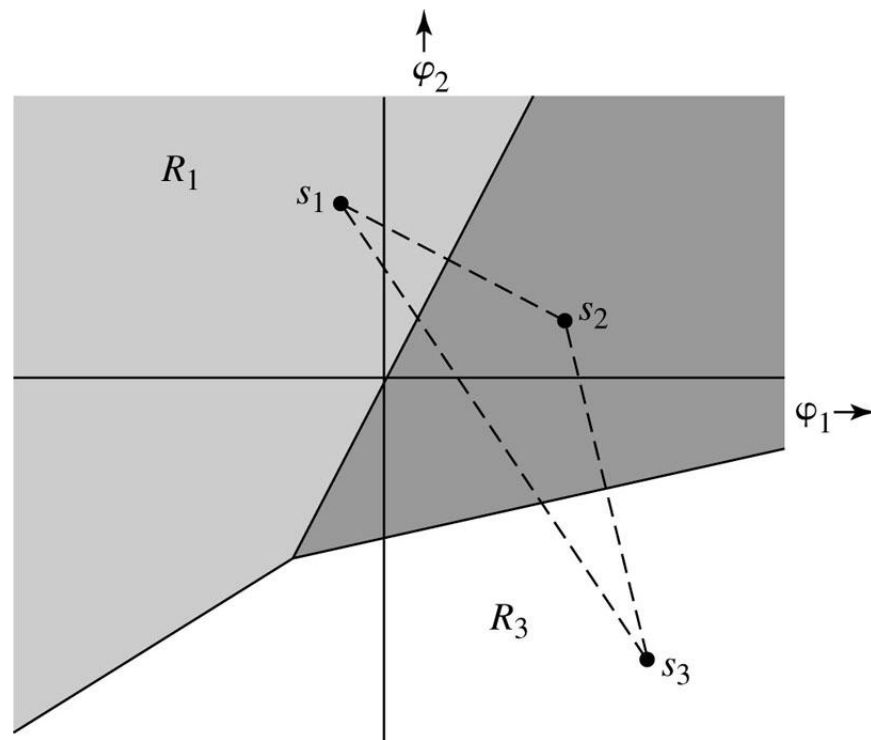


(b)

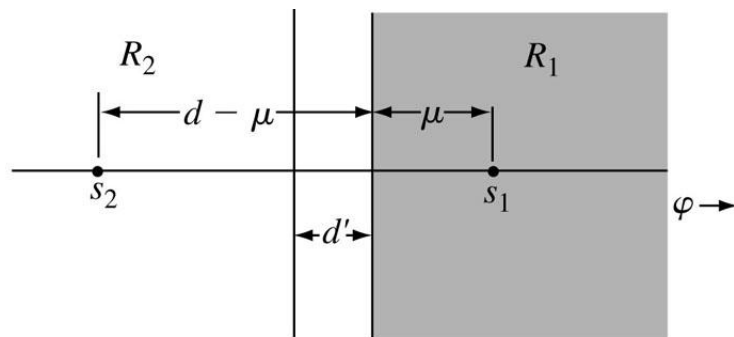
**Figure** Another form of optimum  $M$ -ary receiver: (a) correlator; (b) matched filter.



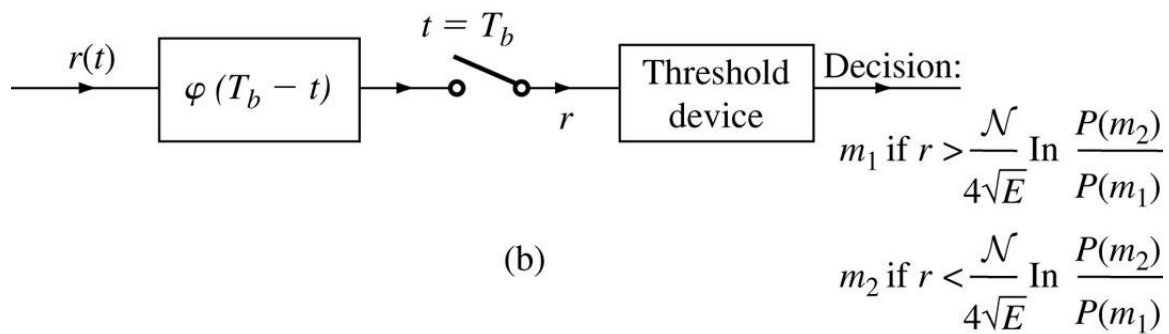
**Figure** Determining optimum decision regions in a binary case.



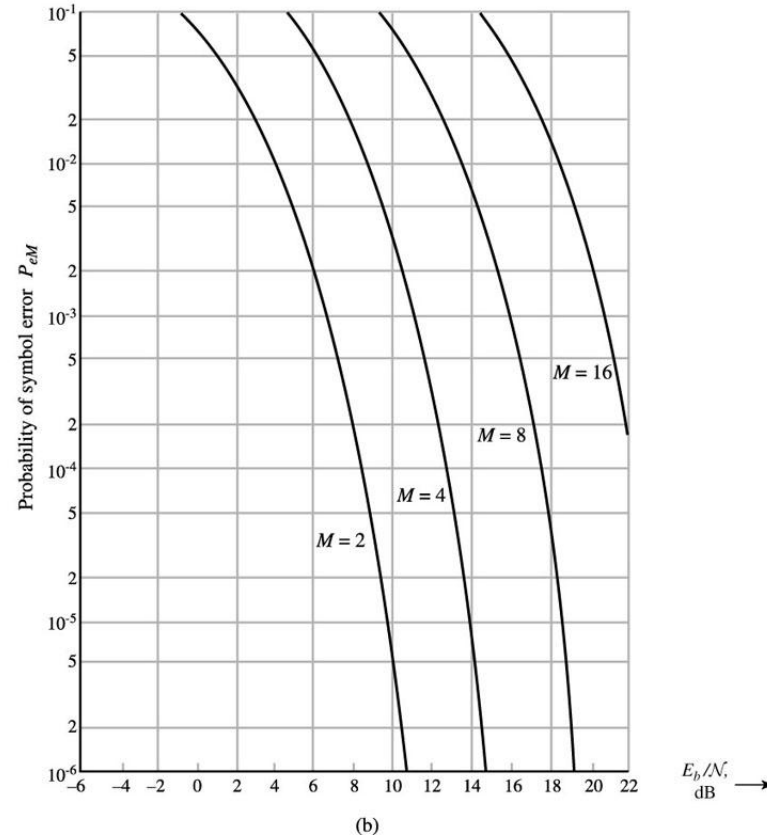
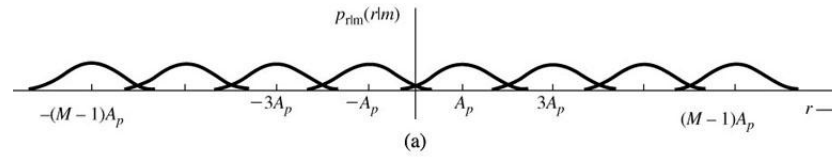
**Figure 11.21** Determining optimum decision regions.



(a)

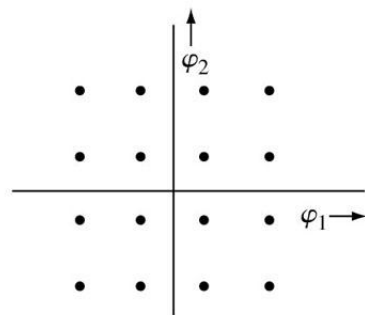


**Figure** Decision regions for the binary case in this example.

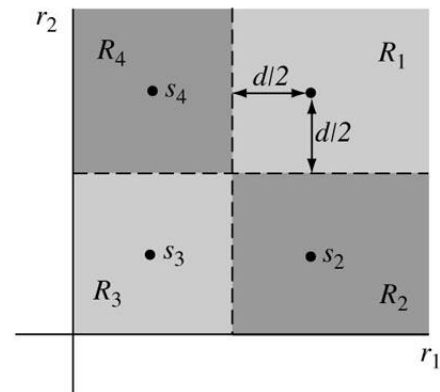


**Figure** (a) Conditional PDFs in PAM. (b) Error probability in PAM.

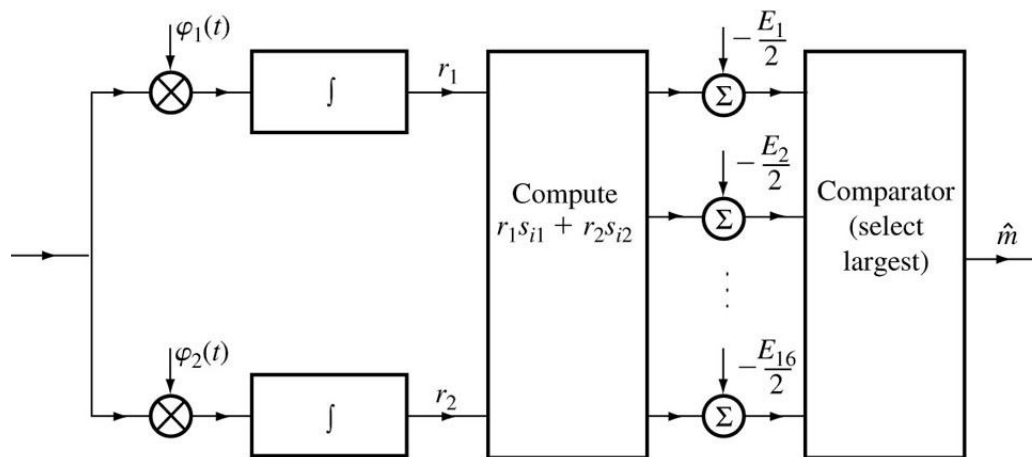




(a)

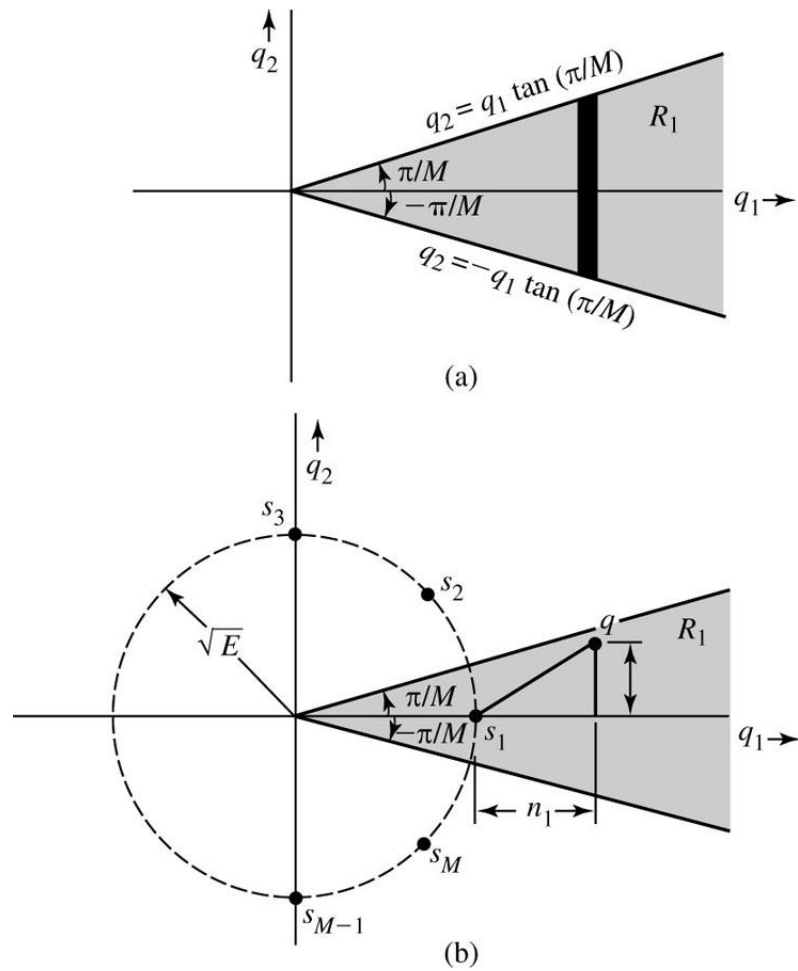


(b)

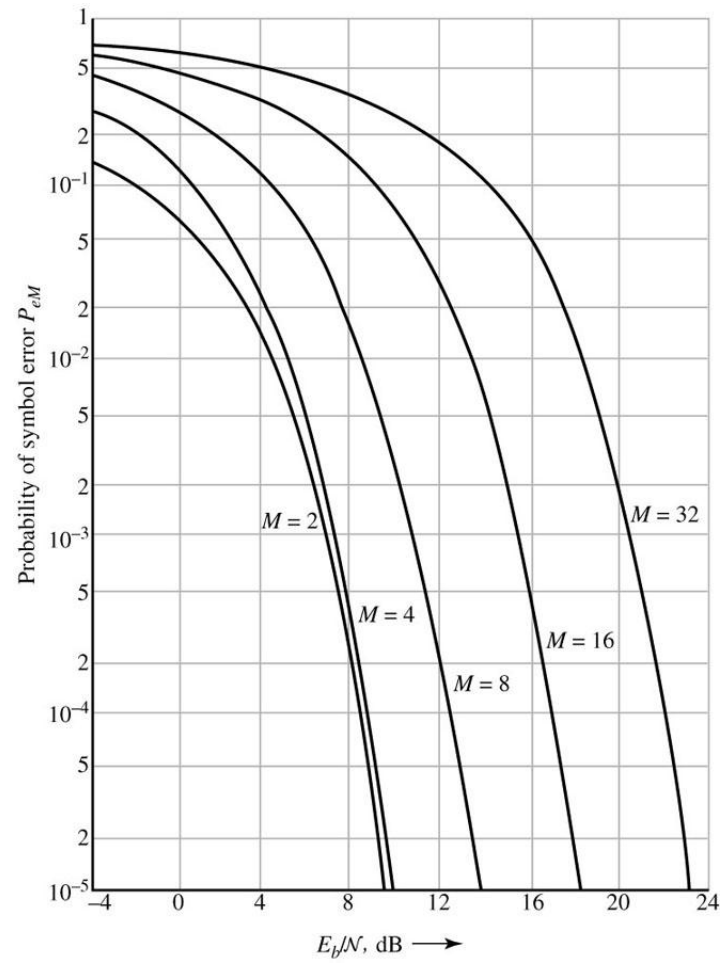


(c)

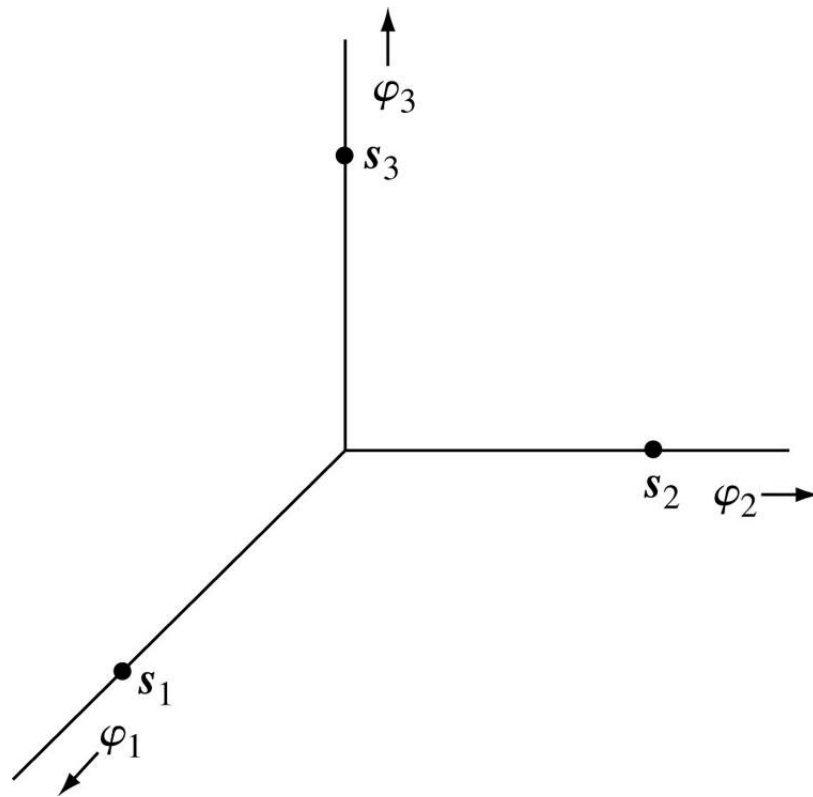
Figure 16-ary QAM.



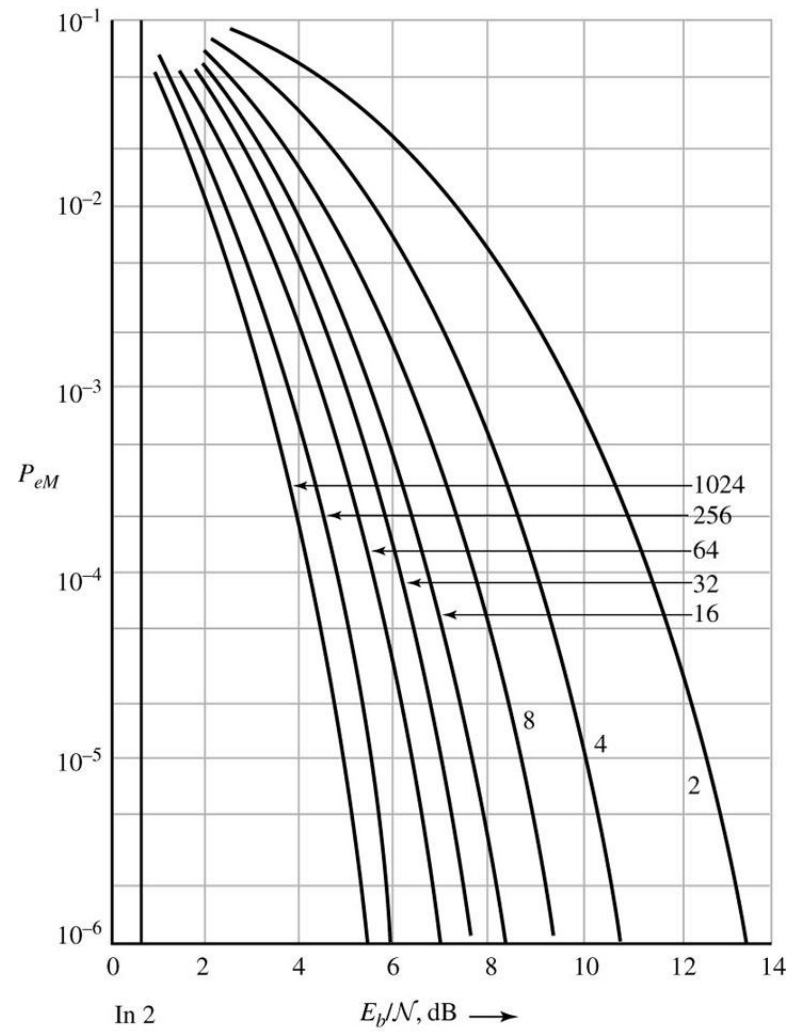
**Figure** MPSK signals.



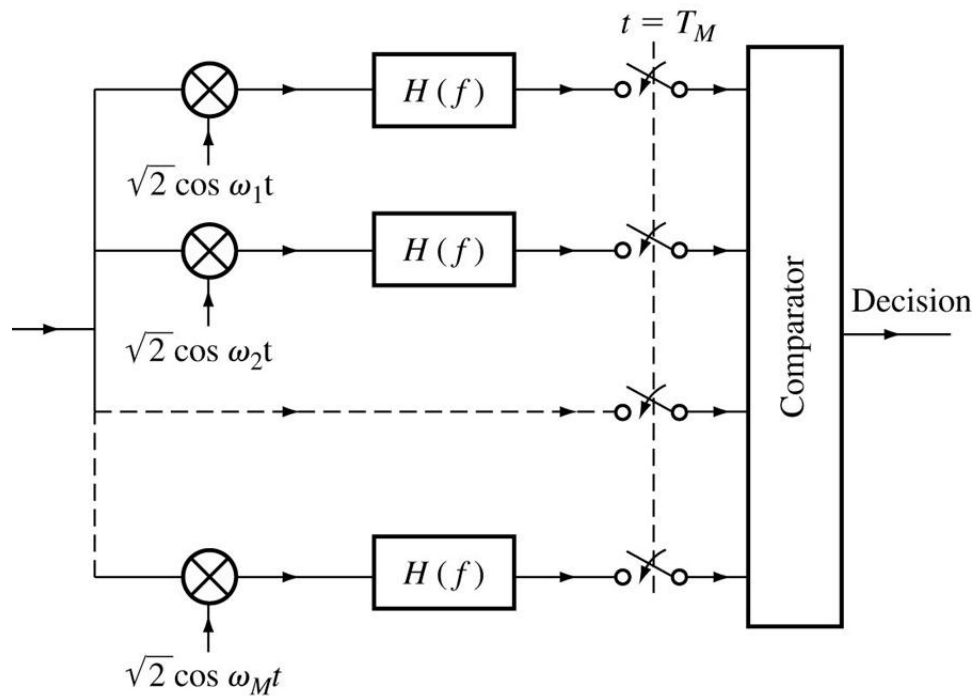
**Figure** Error probability of MPSK.



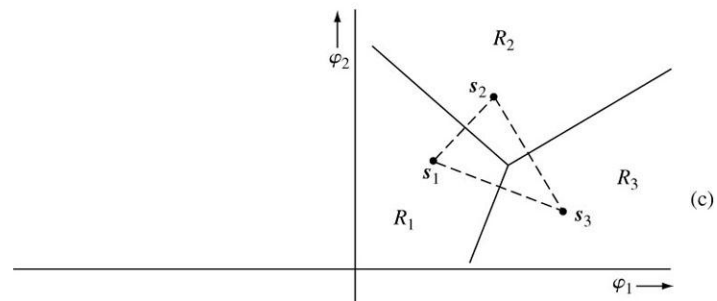
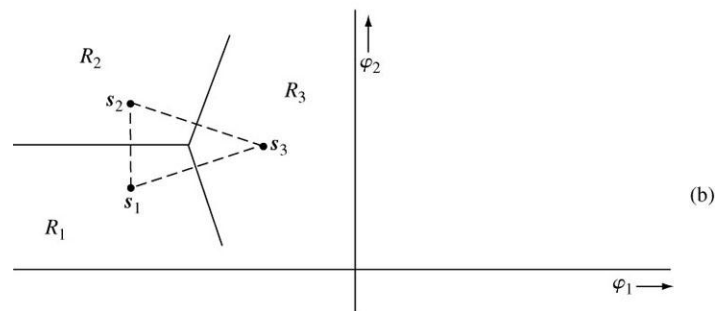
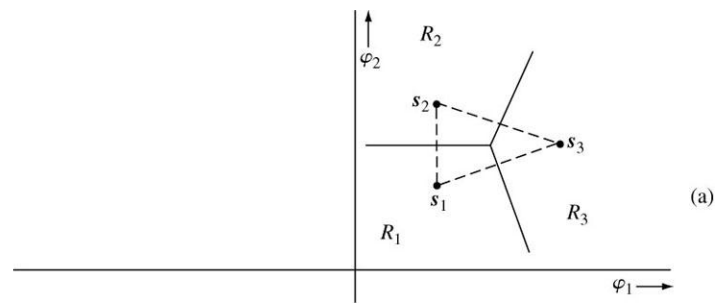
**Figure** Orthogonal signals.



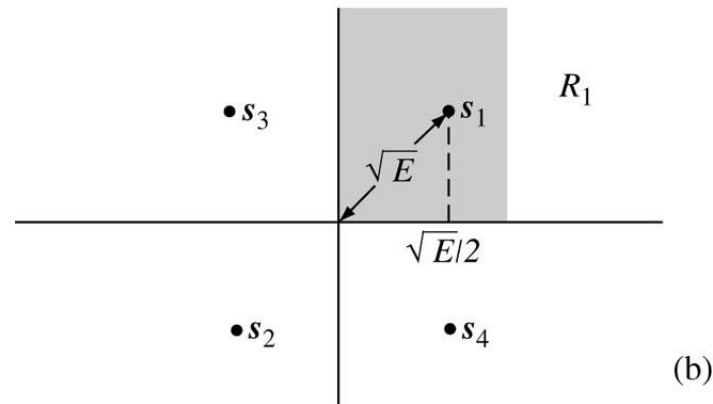
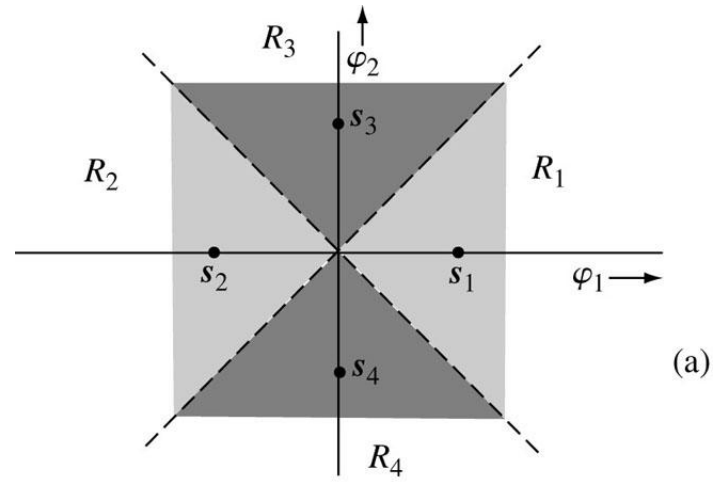
**Figure** Error probability of orthogonal signaling and coherent MFSK.



**Figure** Coherent MFSK receiver.



**Figure** Translation and rotation of coordinate axes.



**Figure** Analysis of QPSK.