

Problem 3.12 Three 8-ary signal constellations are shown in Figure 3.24.

- Express R and $d_{\min}^{(2)}$ in terms of $d_{\min}^{(1)}$ so that all three constellations have the same E_b .
- For a given E_b/N_0 , which constellation do you expect to have the smallest bit error probability over a high SNR AWGN channel?
- For each constellation, determine whether you can label signal points using three bits so that the label for nearest neighbors differs by at most one bit. If so, find such a labeling. If not, say why not and find some “good” labeling.

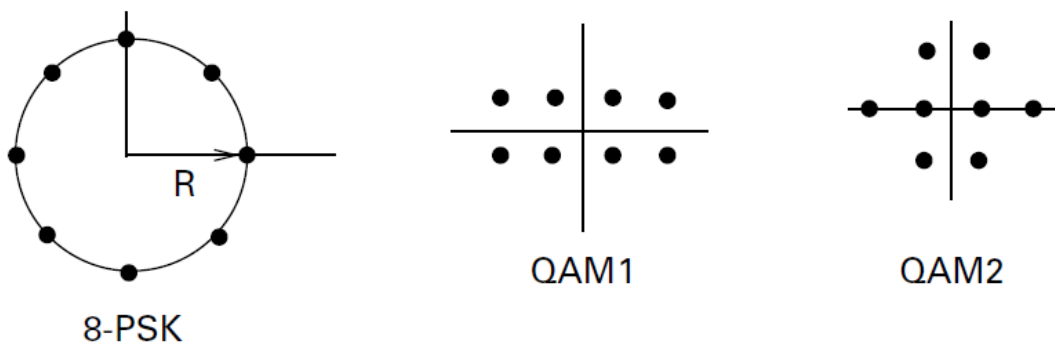


Fig. 3.24