Problem 10.14. Draw the Gray-encoded constellation (signal-space diagram) for 16-QAM and for 64-QAM. Can you suggest a constellation for 32-QAM?

Solution

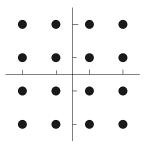
A general hint for Gray encoding is to

(a) first Gray encode two bits and assign one pair of the resulting encoding to each quadrant.

(b) Gray encode the remaining bits within one of the quadrants.

(c) obtain the Gray encodings for the remaining quadrants by reflecting the result across the in-phase and quadrature axes.

16-QAM constellation:



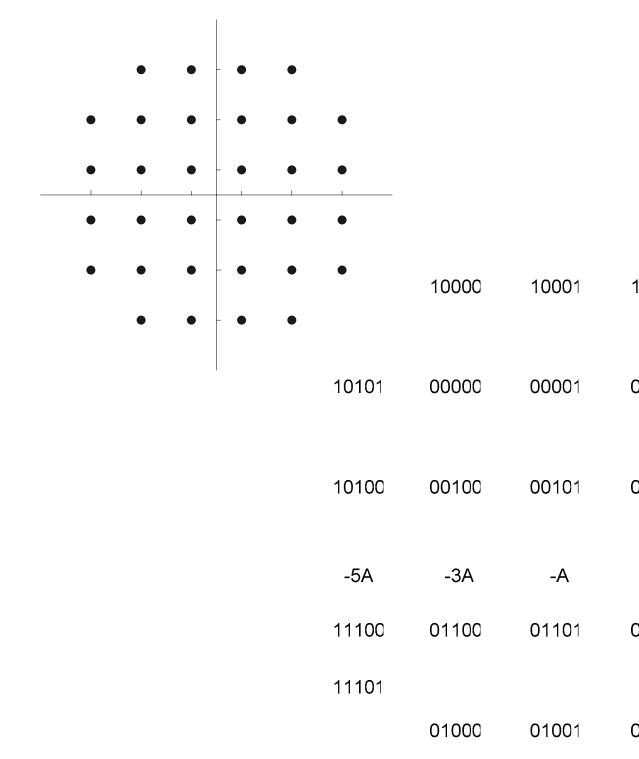
64-QAM constellation:

٠	•	•	•	- ●	•	٠	•			
٠	•	•		- ●	•	٠	•			
•	•	•	•	-	•	•	•		/	
•	•	•	•	- ●	•	•	•	0000	0001	0011
•	•	•	•	- •	•	•	•	0100	0101	0111
•	•	•	•	-	•	•	•	0.4	^	٨
-	-	-	-	-	-	-	-	-3A	-A	А
٠	•	•	•	- •	•	٠	•	1100	1101	1111
•	•	•	•	- ●	•	•	•	1000	1001	1011
				Continued on next slide						

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Problem 10.14 continued



32-QAM constellation: (There does not appear to be a Gray encoding for 32-QAM)

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