

Quiz 3 Solutions

Communication Systems (EE 308), Autumn'19

QUESTION 1

Parts (a) and (b) are from problem 5.29 on p. 205, Haykin, which is part of Homework 6. A solution to part (c) is as follows. The average powers of $n_I(t)$ and $n_Q(t)$ are:

$$E(n_I^2(t)) = E(n_Q^2(t)) = E(n^2(t)) = \int_{-\infty}^{\infty} S_n(f) df = 2 \times \frac{1}{2} \times (7 - 4) \times 1 = 3W.$$

QUESTION 2

This is problem 6.3 on p. 235, Haykin.

Note that in the solutions manual of Haykin, there is an error: the average power of the modulated wave is 10 W. So $\frac{A_c^2 P}{2} = 10$. Hence, the output SNR is $\frac{A_c^2 P}{0.008} = \frac{2 \times 10}{0.008} = 2500$, and not 1250 as given in the solutions manual.

QUESTION 3

This is problem 5.10, part 2, on p. 263, Proakis, which is part of Homework 7.

QUESTION 4

This is problem 6.8 on p. 236, Haykin.