

Homework #6

Problems from the book:

1. book problem 4.1
2. book problem 4.6
3. book problem 4.7
4. book problem 4.8
5. book problem 4.12
6. book problem 4.14

7. Show that $P_{rec} = \frac{Q}{R} \left(q F_A Q \Delta f + \frac{\sigma_T}{M} \right)$ using $\sigma_s^2 = 2 q M^2 F_A R (2 P_{rec}) \Delta f$ and

$$Q = \frac{I_1 - I_0}{\sigma_1 + \sigma_2}$$

Use the following specification sheet for problem 8-11:

http://www.bookham.com/documents/datasheet_PT10XGC.pdf.

8. What is the quantum limited minimum detectable power (zero thermal noise) at a bit rate of $\text{BER}=10^{-9}$ and a data rate of 2.5Gbps?
9. What is the Noise Equivalent Power (NEP) for this receiver?
10. What is the minimum detectable power of this receiver if it is used at a $\text{BER}=10^{-9}$ and a data rate of $B=2.5\text{Gbps}$?
11. What is the minimum detectable power of this receiver if it is used at a $\text{BER}=10^{-9}$ and the electrical filter is adjusted $\Delta f=2.5\text{GHz}$?