EE 567

Homework 9

Due Tuesday, November 5, 2019

Work all 2 problems.

Problem 1. A receiver front end has a noise figure of 8 dB and a gain of 60 dB and a bandwidth of 12 MHz. The input signal power is 10^{-11} W. The antenna temperature is 175 K. Find $T_e,\ T_s,\ N_{out},\ SNR_{in}$ and SNR_{out}. You may use $T_0 = 290$ K and Boltzmann's constant equals 1.38×10^{-23} J/K.

Problem 2. Using the same design as Problem 1 an additional amplifier is inserted in the system before the one described in Problem 1 (a preamplifier) so that now the antenna feeds energy to two networks in cascade. The preamp has a noise figure of 3 dB and a gain of 12 dB and a bandwidth of 10 MHz. Find $T_s,\ F_{out},\ N_{out}$ and SNR_{out}, where F_{out} is the overall or composite F. Indicate how much this design improved SNR_{out} relative to the design in Problem 1.