

University of Texas at San Antonio
Department of Electrical and Computer Engineering
4G and WiFi Networks: EE 5283
Dr. Kelley
Homework Assignment #4
Due Monday Nov. 10th, 2014
Exam 2: Friday , Nov 14, Covers up to this HW

Write a Matlab model that generates the a six sector hexagonal model of a wireless cellular network with a cell re-use factor of 1 and *nearest* 6 co-channel cells, $N_0 = 10^{-8} \text{ watts/Hz}$. Assume no fading (e.g. fading channel of $h_k = 1$.) Upload your code to blackboard.

- 1) (25 pts.) Generate a method that computes the Eb/No at a location (x, y) within the target cell or on the cell edge for a
 - i. Cell radius of 1 Km
 - ii. Cell Reuse of 1
 - iii. Transmit power of 100 watts
 - iv. Path loss model:
 1. exponent of 2.2 defined by $P(d) = d^{-2.2}$
 2. use increments of 10 meter on your distance grid and $d_{min} = 1 \text{ meter}$
- 2) (25 pts.) Generate a 2-Dim image display which illustrates color versus Eb/No, neglecting the Interferences (e.g. use SNR, not SNIR)
- 3) (25 pts.) Using a histogram approximation to the probability density function, generate a method that plots the cumulative distribution function (CDF) of the $(Eb/No)_{dB}$ within the target cell assuming users are uniformly distributed in the 2-Dim cell space, neglecting the Interferences (e.g. use SNR, not SNIR).
- 4) (25 pts.) Generate a 2-Dim image display which illustrates color versus Eb/No, accounting for interference and a cell-reuse of 1. For this this case use $SNIR=S/(N+I)$.
- 5) (25 pts.) Using a histogram approximation to the probability density function, generate a method that plots the cumulative distribution function (CDF) of the $(Eb/No)_{dB}$ within the target cell assuming users are uniformly distributed in the 2-Dim cell space, accounting for interference and a cell-reuse of 1. For this this case use $SNIR=S/(N+I)$.

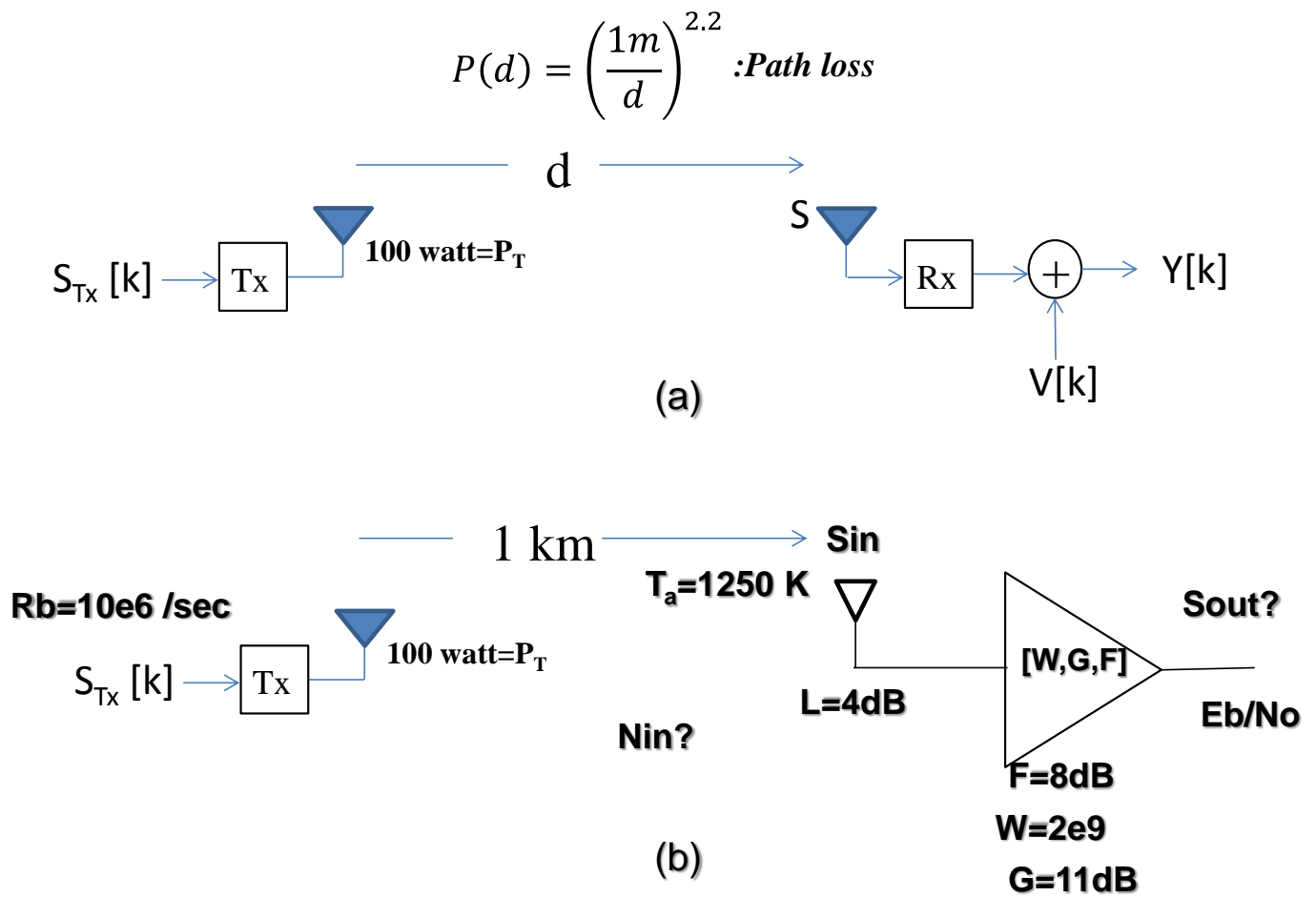


Figure 1: The Path loss model

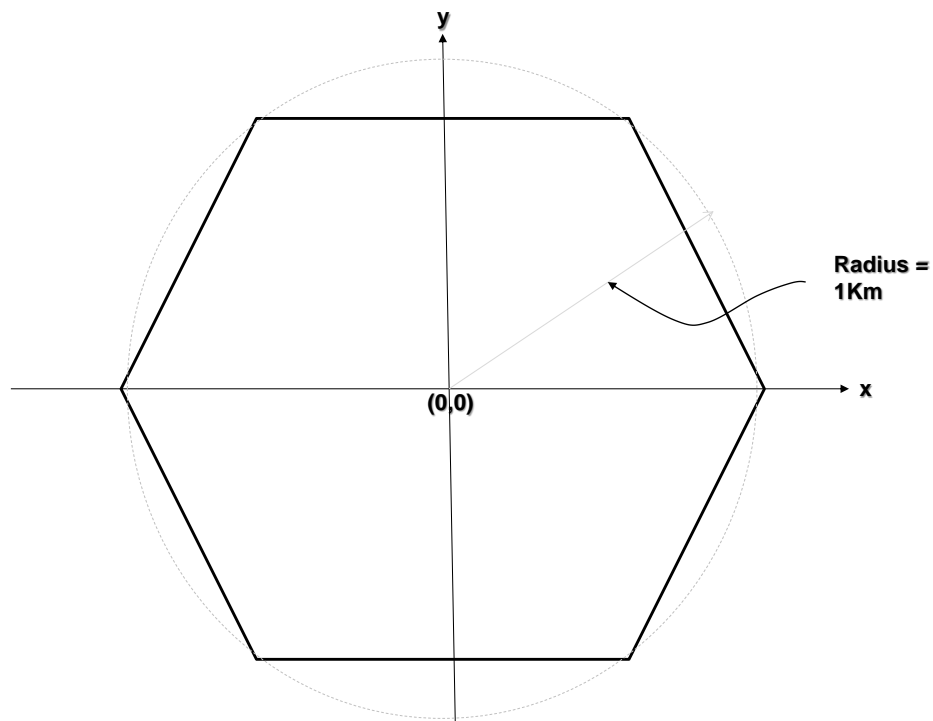


Figure 2: Cell: Assume a reuse of 1.

