Homework 1 submission

ECET 512 — Wireless Systems

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April 11, 2022

1 Submitted files

For this assignment, besides this report, the following archives were created:

1.1 SRC Folder

+ *"demo.m"*: This function was given for the homework as a part of code framework
+ *"drawCell.m"*: This function was given for the homework.
+ *"drawCluster.m"*: This function allows the user to plot a cluster of N cells with N being 3,4 and 7 only as asked.
+ *"ServingCell1.m"*: This function computes the serving cell. The serving cell is highlighted and a line is drawn from mobile to center of the serving cell.

1.2 DOC Folder

+ *"video.avi"*: This video shows interference with other cells.
+ *"graphN.jpg"*: This represents all the graphs. Where N is the graph number.
+ *"interference.jpg"*: This represents the intereference of cells.

2 Code explanation

The code for this homework has been developed with MATLAB 2022a. The mobile moves across different cells along a fixed path. Real time locations of mobile are sampled. Number of samples are increased with increase in frame rate. An array stores the real time sampled distances from active base stations. Then it is sorted in ascending order. The sorted array is then used to plot the path loss equation where received power is in decibels.

3 Discussion

In this homework a simulation was done for interference with ohter cells. Graphs were plotted for path loss models with and without shadowing. Interference values were calculated. Finally Signal to Interference ratio was calculated.

The value of interference was the simulation was calculated to be -104 dBm assuming distance between interfering cells to be 450 units. The Signal to Interference ratio was calculated to be 1.2 and 1.86 for path loss exponents 3 and 4 respectively.

Graphs were generated for both with and without shadowing. The Standard deviation was taken to be 8 dBm as given for randomness of shadow model.

4 Running the Matlab code

Open the demo.m file in MATLAB along with all other .m files and run it.