Homework No. 4
Simulation of TPC-SR Algorithm

In this homework, apply TPC and TPC-SR algorithms to a simple 4-cell wireless network in which users are distributed in a 1000 m $\times$ 1000 m area covered by 4 base stations and have the same target-SINR of $\hat{\gamma}_i = 0.2$. The users should be uniformly distributed in the cell, where $h_i = 0.09d^{-3}$. Each cell covers 500 m $\times$ 500 m and each user is assigned to its nearest base station. Consider different total number of users, ranging from 4 users (1 user/cell) to 28 users (7 users/cell) with step size of 4 users. To do so, for each total number of users, locate uniformly and randomly the users in 4 cells, apply TPC and TPC-SR algorithm separately, and compute their outage probability and aggregate transmit power at the equilibrium where the algorithms converge. Assume a constraint on maximum power ($p_{max} = 1mW$) and background noise power of $\sigma^2 = 10^{-12}$.

- Plot the outage probability and the aggregate transmit power versus the total number of users, respectively, for TPC and TPC-SR.
- Compare TPC and TPC-SR algorithms in feasible and infeasible systems.

Please note that you should upload your HW in a zipped folder named 'HW4 your student number'. This folder must include 1- your code files (ending in .m) and 2- your report file containing your plots and answers to different parts of HW.