

# Readme

We include two R code files.

- In “Case(A)-Simu.R”, we implement ExUCB policy to our simulation setting for Case **(A)**. The noise distribution is specified as a Uniform mixture  $\frac{3}{4}\text{Unif}(-15, 0) + \frac{1}{4}\text{Unif}(0, 15)$ , which is verified in Appendix B.1 to satisfy both Lipschitz and 2nd-order smoothness assumptions.
- In “Case(B)-Simu.R”, we implement ExUCB policy to our simulation setting for Case **(B)**. The noise distribution is specified as a Uniform mixture  $\frac{1}{4}\text{Unif}(-15, 0) + \frac{3}{4}\text{Unif}(0, 15)$ , which is verified in Appendix B.2 to satisfy only the Lipschitz assumption.

Both our codes in the two files can be divided into three parts.

**Line 11 – 87.** Preparation: we construct the CDF function, the mapping function from  $x^\top \theta_0$  to the optimal price, specify the constants, and initiate the data-recording matrices and arrays

**Line 90 – 231.** 100 Replications: include exploration phase,  $\theta_0$  estimation, and the implementation of the Inner UCB Algorithm in the UCB phase

**Line 237 – 287.** Log-log Plot: we construct 95% Confidence Intervals (CI), do the linear fit, and plot the log-log scale of accumulative regrets along with their CI

To reproduce our results, you can just run the complete codes in the two files. Furthermore, there are in-code explanations for better understanding.