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This study presents two new algorithms for solving linear stochastic bandit problems. The proposed

methods use an approach from nonparametric statistics called bootstrapping to create con\_dence

bounds. This is achieved without making any assumptions about the distribution of noise in the

underlying system. We present the X-Random and X-Fixed bootstrap bandits which correspond to

the two well-known approaches for conducting bootstraps on models, in the literature. The proposed

methods are compared to other popular solutions for linear stochastic bandit problems, namely,

OFUL, LinUCB and Thompson Sampling. The comparisons are carried out using a simulation study

on a hierarchical probability meta-model, built from published data of experiments, which are run on

real engineering systems. The model representing the response surfaces is conceptualized as a Bayesian Network which is presented with di\_erent distributions and degrees of noise for the simulations. The study also classi\_es the meta-data into various classes of engineering systems to perform further empirical studies into the performance of the algorithms. One of the proposed methods, X-Fixed bootstrap, performs better than the baselines in-terms of cumulative regret across all explorations. In certain settings the cumulative regret of this method is almost 20% less than that of the best baseline. The X-Random bootstrap performs comparably in most situations and particularly well when the number of trials is high. The study concludes that these algorithms could be a preferred

alternative for solving linear bandit problems, especially when the distribution of the noise in the

system is unknown.