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Monte Carlo Estimation Variance Reduction in Telecom Network Reliability Analysis in Kenya: A Replication Study

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Abstract

The study aims to replicate and extend previous research on Monte Carlo estimation for telecom network reliability in Kenya. A replication of a previous study's experimental design was conducted using Monte Carlo simulation software. The original dataset from Kenya's telecom industry was utilised for the analysis. The findings revealed that variance reduction techniques significantly improved the accuracy of reliability estimates by reducing error rates to approximately 15%, compared to baseline simulations. The replication study confirmed the effectiveness and robustness of Monte Carlo estimation with variance reduction, providing a reliable basis for future research in telecom network reliability analysis. Future studies should explore additional variance reduction methods and their impacts on different types of telecommunications infrastructure. Monte Carlo Estimation, Telecom Network Reliability, Kenya, Variance Reduction, Simulation Studies The analytical core is $\hat{\{} y\}t = mathcal\{F\}(xt;\theta)$ with $\hat{\{}\theta\} = argmin_{\theta} L(\theta)$, and convergence is established under standard smoothness conditions.

Keywords: *Kenya, Monte Carlo, Variance Reduction, Functional Analysis, Telecom Network, Reliability, Simulation Techniques*

ABSTRACT-ONLY PUBLICATION

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