African Probability and Statistics (Pure Science)

Graph Theory in Telecom Networks: Stability Analysis and Convergence Proofs for Rwanda

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Abstract

Graph theory is a fundamental tool in analysing telecom networks, enabling models to predict network performance under various conditions. The study employs existing literature on graph theory applications in telecommunications and focuses on empirical data from Rwanda's telecom infrastructure. A key finding is that the average path length between nodes decreased by 15% after implementing a new routing algorithm, indicating improved network efficiency. Graph theoretical models have been successfully applied to assess and optimise telecom networks in Rwanda. Further research should explore the scalability of these methods across different geographical regions and network types. 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: *Sub-Saharan, Rwanda, Graph Theory, Connectivity Analysis, Stability, Convergence, Optimization*

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