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Matrix Decompositions for Telecom Network Reliability in Rwanda: Stability Analysis and Convergence Proofs

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Abstract

Matrix decompositions are fundamental tools in mathematics used for simplifying complex systems into more manageable components. The article reviews existing literature on matrix decompositions and their applications in telecommunications, with a focus on mathematical models that ensure network robustness. A key finding is the identification of a specific algorithm that demonstrates improved computational efficiency by reducing the number of iterations needed for convergence. This review underscores the importance of rigorous stability analysis and convergence proofs to validate matrix decomposition methods in real-world telecommunications networks. Future research should focus on integrating these decompositions into existing network management systems to enhance their reliability and efficiency. Matrix Decomposition, Telecom Network Reliability, Stability Analysis, Convergence Proofs 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: *Matrix Decomposition, Telecom Networks, Stability Analysis, Convergence Proofs, Rwanda Geography, Graph Theory, Linear Algebra*

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