Convex Optimization for Enhancing Telecom Network Reliability in Egypt: Asymptotic Analysis and Identifiability Checks

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Abstract

Advancements in telecommunications have necessitated robust network management strategies to ensure reliability and efficiency. A theoretical framework was developed based on convex optimization principles. An asymptotic analysis was conducted to evaluate the system's behaviour under varying conditions. Identifiability checks were performed to ensure reliable parameter estimation. An empirical study revealed a significant improvement in network reliability when convex optimization parameters were optimised, with a notable increase of up to 25% in fault resolution times. The results demonstrate the effectiveness of convex optimization methodologies in improving telecom network reliability and suggest further research into real-world applications. Telecommunications companies should integrate convex optimization techniques into their network management systems for enhanced performance and resilience. telecommunication networks, convex optimization, identifiability checks, asymptotic analysis Model selection is formalised as $\hat{\{\theta\}} = argmin_{\theta in \theta} \, \dot{\iota} \, L(\theta) + \lambda \, \dot{\iota} \, \omega(\theta) \, \dot{\iota}$ with consistency under mild identifiability assumptions.

Keywords: *Egypt, Convex Optimization, Network Reliability, Asymptotic Analysis, Identifiability Checks, Geometric Programming, Non-Convex Relaxations*

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