African Geometry and Topology (Pure Science)

Monte Carlo Estimation with Variance Reduction for Numerical Optimization of Telecom Network Reliability in Senegal

Cheikh Ali Touré Moussa[1], **Mamadou Lamine Diallo**[2,3], **Lalla Mariama Ndiquaye**[4], **Oumar Ndiaye Diop**[5]

[1] African Institute for Mathematical Sciences (AIMS) Senegal

[2] Department of Interdisciplinary Studies, Université Gaston Berger (UGB), Saint-Louis

[3] Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

[4] Université Alioune Diop de Bambey (UADB)

[5] Department of Research, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

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Correspondence: cmoussa@aol.com

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Author notes

Cheikh Ali Touré Moussa is affiliated with African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Mathematics research in Africa.

Mamadou Lamine Diallo is affiliated with Department of Interdisciplinary Studies, Université Gaston Berger (UGB), Saint-Louis and focuses on Mathematics research in Africa.

Lalla Mariama Ndiquaye is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Mathematics research in Africa.

Oumar Ndiaye Diop is affiliated with Department of Research, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Mathematics research in Africa.

Abstract

The telecommunications industry in Senegal is crucial for economic development, necessitating robust network reliability to ensure service quality and customer satisfaction. Monte Carlo methods will be employed to simulate various scenarios of network traffic and failures. Variance reduction strategies will be applied to enhance the efficiency of the estimation process. The theoretical framework provides a robust method for optimising telecom network reliability using advanced statistical techniques. Telecom operators should consider implementing these methods to improve network resilience and service quality. Model selection is formalised as $\hat{\{\theta\}} = argmin_{\theta in \theta} ¿ L(\theta) + \lambda ¿ \omega(\theta) ¿$ with consistency under mild identifiability assumptions.

Keywords: *African Geography, Monte Carlo Estimation, Variance Reduction, Numerical Optimization, Telecom Network Reliability, Simulation Techniques, Statistical Methods*

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