



Asymptotic Analysis and Identifiability Checks in Numerical Optimization for Traffic Flow Management in Senegal

Amadou Sall¹, Diop Diome^{2,3}, Samba Ndiaye⁴, Fall Gueye^{5,6}

¹ Université Gaston Berger (UGB), Saint-Louis

² Department of Interdisciplinary Studies, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

³ Department of Advanced Studies, Cheikh Anta Diop University (UCAD), Dakar

⁴ Department of Advanced Studies, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

⁵ Cheikh Anta Diop University (UCAD), Dakar

⁶ Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

Published: 23 August 2000 | **Received:** 18 June 2000 | **Accepted:** 21 July 2000

Correspondence: asall@outlook.com

DOI: [10.5281/zenodo.18714434](https://doi.org/10.5281/zenodo.18714434)

Author notes

Amadou Sall is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Mathematics research in Africa.

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

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

Fall Gueye is affiliated with Cheikh Anta Diop University (UCAD), Dakar and focuses on Mathematics research in Africa.

Abstract

The challenge of optimising traffic flow in urban areas is exacerbated by varying road conditions and unpredictable traffic patterns. A mathematical framework was established to simulate traffic scenarios. The model incorporates data from the Senegalese transportation network and uses asymptotic analysis to assess its stability under different conditions. The simulation revealed that traffic congestion is significantly influenced by road construction projects, with a reduction of 15% in congestion levels observed when these projects are completed. This study provides insights into the impact of infrastructure improvements on traffic flow efficiency. Future research should explore the economic impacts and broader implications of traffic management policies based on this model. traffic optimization, numerical simulation, asymptotic analysis, Senegal Model selection is formalised as $\hat{\theta} = \operatorname{argmin}_{\theta \in \Theta} \mathcal{L}(\theta) + \lambda \mathcal{R}(\theta)$ with consistency under mild identifiability assumptions.

Keywords: *Sub-Saharan, Optimization, Identifiability, Asymptotic, Sensitivity, Numerical, Simulation*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge