African Probability and Statistics (Pure Science)

Finite-Element Discretization and Error Bounds in Dynamical Systems for Traffic Flow Optimization in South Africa

Sibusiso Mthethwa[1], **Nokwe Zulu**[2], **Mdlalose Xaba**[2,3]

[1] Department of Research, SA Medical Research Council (SAMRC)

[2] South African Institute for Medical Research (SAIMR)

[3] University of Zululand

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Correspondence: smthethwa@yahoo.com

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Author notes

Sibusiso Mthethwa is affiliated with Department of Research, SA Medical Research Council (SAMRC) and focuses on Mathematics research in Africa.

Nokwe Zulu is affiliated with South African Institute for Medical Research (SAIMR) and focuses on Mathematics research in Africa.

Mdlalose Xaba is affiliated with South African Institute for Medical Research (SAIMR) and focuses on Mathematics research in Africa.

Abstract

Finite-element discretization methods are widely used in solving partial differential equations (PDEs), which describe dynamical systems governing traffic flow optimization. A mathematical model based on PDEs will be discretized using the finite-element method, with assumptions about traffic dynamics and network characteristics. This framework provides a robust theoretical basis for understanding and optimising traffic flow dynamics on South African roads using numerical methods. Further research should validate these findings with empirical data from real-world traffic scenarios. Model selection is formalised as $\hat{\{}\theta\} = argmin_{\theta in\theta} ¿ L(\theta) + \lambda ¿ \omega(\theta) ¿$ with consistency under mild identifiability assumptions.

Keywords: *African Dynamics, Finite-Element Method, Dynamical Systems, Traffic Flow, Optimization, PDEs, Stability Analysis*

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