Asymptotic Analysis and Identifiability of Nonlinear Differential Equations in Telecom Network Reliability in Rwanda: A Theoretical Framework

Hutukirwa Bizimana[1,2]**, Gasumuremyi Habimana**[3]**, Kigutu Kabingiro**[1,4]

[1] Rwanda Environment Management Authority (REMA)

[2] Department of Interdisciplinary Studies, University of Rwanda

[3] Department of Interdisciplinary Studies, African Leadership University (ALU), Kigali

[4] University of Rwanda

Correspondence: hbizimana@aol.com

Author notes

Hutukirwa Bizimana is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Mathematics research in Africa.

Gasumuremyi Habimana is affiliated with Department of Interdisciplinary Studies, African Leadership University (ALU), Kigali and focuses on Mathematics research in Africa.

Kigutu Kabingiro is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Mathematics research in Africa.

Abstract

Theoretical analysis of nonlinear differential equations is a fundamental aspect of mathematical modelling in various fields including telecommunications network reliability. Theoretical derivations are employed to derive equations representing nonlinear differential models. Identifiability checks are conducted using statistical methods based on assumptions about the system parameters. The theoretical framework provides insights into the stability and predictability of telecom networks in Rwanda, offering a solid foundation for further empirical studies. Future research should validate these theoretical findings through practical application and identify potential areas for improvement in network design and operation. 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: *Sub-Saharan, Rwanda, Nonlinear, Differential, Equations, Stability, Identifiability*

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