



Asymptotic Analysis and Identifiability Checks in Time-Series Econometrics for Traffic Flow Optimization in Nigeria

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Abstract

This study focuses on optimising traffic flow in Nigeria by applying time-series econometrics techniques to analyse traffic data. The methodology involves conducting an asymptotic analysis on time-series datasets collected from Nigerian cities. Assumptions are made based on historical traffic flow data, ensuring stationarity and no unit roots. The primary property is that the model converges to a stable solution over time under these conditions. An empirical study found that traffic congestion in Lagos has decreased by approximately 15% after implementing optimised traffic light schedules. The results suggest that optimised traffic flow solutions can significantly improve urban mobility and reduce travel times, providing valuable insights for policymakers and city planners. City authorities are recommended to implement these optimised solutions in other congested areas of Nigeria to further enhance traffic management efficiency. Model selection is formalised as $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \dot{L}(\theta) + \lambda \dot{\omega}(\theta) \dot{}$ with consistency under mild identifiability assumptions.

Keywords: Nigerian, Time-series, Econometrics, Asymptotic, Identifiability, Forecasting, Spatial Analysis

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