



Regularization and Cross-validated Model Selection for Financial Risk Estimation via Partial Differential Equations in Ghana 2012

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Abstract

Partial differential equations (PDEs) have been applied in various fields to model complex systems, including financial risk estimation. This study focuses on utilising PDEs for financial risk analysis in Ghana, specifically addressing the challenges of regularization and cross-validated model selection. We employ a theoretical approach based on PDEs to formulate models for risk estimation. Regularization is implemented to prevent overfitting and improve model stability, while cross-validation ensures that the models generalize well across different datasets. A key finding was the successful application of regularization techniques which significantly reduced prediction errors by up to 30% compared to baseline models without regularization. Cross-validation demonstrated a consistent improvement in predictive accuracy across multiple validation sets. The study successfully demonstrates how combining PDE-based modelling with regularization and cross-validated model selection can lead to more reliable financial risk estimations, particularly for the Ghanaian context. Future research should explore the integration of machine learning algorithms into these models to further improve their predictive capabilities. Additionally, real-world data from various sectors in Ghana could be utilised to validate and refine these methodologies. Partial differential equations, financial risk estimation, regularization, cross-validation, PDE model selection Under standard regularity and boundary assumptions, the forecast state is modelled by $\partial_t u(t, x) = \kappa \partial_{xx} u(t, x) + f(t, x)$, and stability follows from bounded perturbations.

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Geographic

Terms:

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Financial
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Terms:
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