

MODELING PRICE VARIATION OF TEA PRODUCTS IN SRI LANKAN ESTATE: A LAGRANGE INTERPOLATION APPROACH

Indrawansha N. G. G. R. K. and Faham M. A. A. M.*

Department of Mathematical Sciences, Faculty of Applied Sciences, South Eastern University of Sri Lanka, Sammanthurai, Sri Lanka.

**aamfaham@seu.ac.lk*

The dissertation "Modeling Price Variation of Tea Products in Sri Lankan Estate: A Lagrange Interpolation Approach" develops a mathematical model to analyze the factors influencing tea price fluctuations in Sri Lanka. It uses Lagrange interpolation to create a polynomial that accurately represents changes in tea prices over time, allowing for a detailed examination of market trends based on known data points. The study employs the Lagrange interpolation method to create a forecasting model for tea prices, aimed at assisting estate managers, dealers, and policymakers in making informed decisions. It highlights the movement of tea prices over time, concluding that while natural fluctuations exist, the interpolation technique effectively captures these variations, offering a reliable tool for predicting future price changes. In this study, we used monthly tea production and price variation data from 2019 to 2023. We approached in four ways to model and analyse the data in our study. They are, (i) Monthly wise extrapolation from 2019 to 2023, from January to November and predicted price to December of the respective year for both BOPF and BOP products, (ii) Monthly wise interpolation from 2019 to 2023, from January to September and November, December and predicted price to October of the respective year for both BOPF and BOP products, (iii) Yearly wise interpolation from January to December, from 2019, 2020, 2022 and 2023 and predicted price to each month of 2021 for both BOPF and BOP products and (iv) Yearly wise extrapolation from January to December, from 2019 to 2022 and predicted price to each month of 2023 for both BOPF and BOP products. The study highlights the importance of understanding the mathematical patterns behind agricultural commodity pricing, noting its broader implications for various industries. By applying the Lagrange interpolation method, it demonstrates the technique's practical value for accurate price predictions and its relevance in academic research. This work enhances our understanding of tea pricing modeling and paves the way for exploring more advanced strategies in agricultural economics.

Keywords: *Lagrange's polynomial interpolation, Mathematical modeling, Price forecasting, Sri Lankan tea industry.*