

**LAGRANGE'S INTERPOLATION TECHNIQUE FOR ANALYSING STUDENTS' ACHIEVEMENT IN A UNIVERSITY LEVEL COURSE:
A PRELIMINARY STUDY**

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Abstract

This study aims to model and predict student academic performance in the university-level course Vector Algebra and Geometry using Lagrange polynomial interpolation. This research was conducted in a controlled academic environment where teaching and syllabus variables remained constant. Historical data from 2015 to 2021 were analysed using MATLAB software for computation and visualization. Data from 2015–2019 were used for interpolation; 2017 was tested for interpolation accuracy, while 2020 and 2021 served as extrapolation cases. Key performance indicators, including Average Marks, Maximum and Minimum Marks, and also Pass Rates were assessed. The results affirm that Lagrange interpolation offers meaningful insights into student outcomes when applied within the data range, with moderate limitations in extrapolation. The model showed high accuracy within known data ranges but reduced performance during extrapolation. However, extrapolated predictions showed substantial deviations, with errors exceeding 100%, indicating that the model performs poorly beyond the known data range. The findings demonstrate the potential of mathematical modeling for educational data analysis and forecasting.

Keywords: *Academic Performance, Lagrange Interpolation Polynomial, MATLAB Software, Predictive Modeling, Educational Data Analysis.*