UNIVERSITI TEKNOLOGI MARA

COMPARISON OF CUBIC TRIGONOMETRIC SPLINE AND CUBIC TRIGONOMETRIC B-SPLINE METHODS FOR INTERPOLATING VISITOR DATA

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ABSTRACT

The decline in STEM interest among youth has emphasized the need for more engaging learning environments such as science museums. This study analyzes visitor attendance patterns at Pusat Sains dan Kreativiti Terengganu (PSKT) for the years 2022 and 2023 by applying two interpolation methods—Cubic Trigonometric Spline (CTS) and Cubic Trigonometric B-Spline (CTBS). Both method were implemented in Wolfram Mathematica and tested using various shape parameter values. Their performance was evaluated using Mean Squared Error (MSE) and Root Mean Squared Error (RMSE). The results show that CTS achieved high accuracy when an optimal parameter value was used (lowest error at $\lambda = 7.8$), but its performance declined with parameter changes, indicating sensitivity. In contrast, CTBS maintained consistently low error values across a range of parameters, demonstrating greater stability and flexibility. Based on the findings, CTBS was identified as the more robust interpolation visitor data and supporting better-informed decisions for future STEM outreach strategies.

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