

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

DESIGNING A FRONT CAR BY USING BEZIER  
CURVES AND LAGRANGE INTERPOLATION IN  
COMPUTER-AIDED GEOMETRIC DESIGN (CAGD)

PS15918

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## **ABSTRACT**

Computer-aided geometric design deals with the mathematical description of shape to be used in numerical analysis, computer graphics, computer algebra, approximation theory, and data structures. The purpose of this project is to find the best method applicable in designing a shape. This project also aimed to explore which interpolation gives the best curves with the least usage of control point and which degree of interpolation needed to generate the best curve. There are three (3) objectives of designing a front car by using Computer-Aided Geometric Design (CAGD). Firstly, to design the front car by using Bézier Curves and Lagrange Interpolation with the least control point. Second objective is to compare the flexibility of the Bézier Curves and Lagrange Interpolation by using the number of control point. And lastly is to determine which degree of interpolation needed by Bézier Curves and Lagrange Interpolation in order to generate the best curve. While completing this project, three (3) steps are used in the methodology. Firstly, conduct a study on Bézier Curves and Lagrange Interpolation. Next, the information obtained is used to design a front car using Bézier Curves and Lagrange Interpolation. Lastly, the curves generated from designing the front car using Bézier Curves and Lagrange Interpolation are being compare to know which interpolation gives the best result. The finding from this project is Bézier Curves has the best curves compare to Lagrange Interpolation. The higher the number of control point, the more flexible the flexibility of the curve. The degree of interpolation is used up to degree 3 for Bézier Curves and degree 4 for Lagrange Interpolation to generate the best curve. The significance of this project is to save time during designing shape as the curve can be plotted with the least number of control points but still can produce the best result. Besides that, the fact of using the least number of control points can help in reducing cost to design a shape.