

**DESIGNING 3-DIMENSIONAL ROLLER COASTER LOOPS BY
USING UNIFORM QUADRATIC B-SPLINE AND UNIFORM
CUBIC B-SPLINE**

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DECLARATION BY CANDIDATE

I certify that this report and the project to which it refers is the product of my own work

and that any idea or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.



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ABSTRACT

Quadratic uniform B-spline and cubic uniform B-spline is proposed to be applied in creating new objects by using Computer Aided Geometric Design (CAGD) which have been widely used to the good impact of computers to industries such as car, roller coaster and many more. Furthermore, three dimensional objects can be produced from quadratic uniform B-spline and cubic uniform B-spline by using sweep surface method. Sweep surface is an influential method that is widely used in geometric modelling. The main purpose of this research is to study either the quadratic and cubic B-spline curve can be applied in roller coaster's loop design. In this research, two-dimensional roller coaster's loop design is formed by using quadratic uniform B-spline and cubic uniform B-spline. The loop is analyse by the distance between curve and control polygon. Moreover, the G-force with the different radius of the loop has been calculated. The value of G-force for each method used will be compared to the G-force value of the original roller coaster. Then, the result shows that uniform cubic B-spline curve is best method to apply in designing the two and three dimensional loop roller coaster.

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