EXTENDED CUBIC UNIFORM B-SPLINE AND SWEEP SURFACE IN THREE DIMENSIONAL GRAPHIC OBJECTS

RESEARCH MANAGEMENT INSTITUTE (RMI)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA

BY :

HEAD OF PROJECT
NURSYAZNI BINTI MOHAMAD SUKRI
NOOR KHAIRIAH BINTI RAZALI

DECEMBER 2012

3. Acknowledgements

IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL

First and foremost, I am grateful to Allah S.W.T for giving us the strength and blessing us with good health to complete this project successfully.

We would like to express our special gratitude to UiTM for support us by giving Dana Kecemerlangan and UiTM (T), especially PJI unit for the valuable guidance, cooperation and encouragement. Without these, this project would have been impossible.

We are also very thankful to our beloved parents who has given us encouragement and to all our friends who have given us ideas and continuous support throughout the preparation of this report.

Last but not least, to all who have contributed directly or indirectly in this project. Without them, this project cannot be completed in time. We will always remember their help and advice.

5. Report

5.1 Proposed Executive Summary

Background of Research - In CAD and CAGD field, B-spline curve and surface have been widely used. There are many application of B-spline in industry such as vehicles design, body of ship, and plane. In order to meet some geometric shape conditions or engineer requirements, B-spline curve have to be extended. An extended of cubic uniform B-spline function also can be used in order to form the three dimensional object such as, glass, vase, and top. Sweep surface is an important issue in order to determine the object in three dimensional. It is practical, simple and efficient to be used.

Objective - The main objectives in this project are to study about an extended cubic uniform B-spline curve and sweep surface. Then form the object in the three dimensional by using an extended cubic uniform B-spline curves and revolution technique in sweep surface method.

Problem statement - Bezier and B-Spline are the curves that used widely in computer aided design (CAD) and computer aided geometric design (CAGD). However, some of the characteristics of Bezier and B-Spilne will limit their application in the certain design. An extension of cubic uniform B-Spline curves can be used as the alternative to Bezier and B-Spline.

Research Methodology/Design/Approach – The researchers used an extended cubic uniform B-spline curve to form a two-dimensional object and transform to three-dimensional object by using sweep surface method such as revolution technique.

Expectation Outcome – From the study, the researcher proposed an alternative to other methods such as Bezier and B-spline in order to generate any two-dimensional and three-dimensional objects. This will be useful to designer in order to get the curves needed.

5.2 Enhanced Executive Summary

Spline curve and surface is widely used in Computer Aided Design (CAD) and Computer Aided Graphic Design (CAGD). Extended cubic B-spline is one of the techniques that can be applied in design system or create new objects. Besides, three-dimensional object such as glass, pot, and top and so on can be generated from Extended Cubic B-spline curve by using sweep surface method. Surface sweep technique is widely used in geometry model. Extended cubic B-spline curve can be used and applied in this area as alternative to other curves such as Bezier curves B-spline curves and T-spline curve. Objectives of this project are to study about an extended cubic uniform B-spline curve and sweep surface. Then form the object in the three-dimensional by using an extended cubic uniform B-spline curves and sweep surface method such as revolution. The shape or object is analyzed by using different degree of Extended Cubic B-spline curve and different value of parameter curve λ. The variety shape of curve can be formed by changing the degree and value of shape parameter λ.

Keywords: Extended cubic B-Spline, B-Spline, Sweep Surface, Rotation

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