CAD MODELLING USING GIELIS SUPERFORMULA

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"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarifies their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

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ABSTRACT

To study the free form shapes in the existing objects or products, a range of techniques and methods are available to deliver the product images. It is difficult to represent the product images precisely and effectively by using conventional methods. Gielis Superformula is one of the approaches which can deal especially with closed or opened curves that can be considered as an evolution of ellipses. The main objective of this study is to implement the mathematical expression of Gielis Superformula in generating various type of 2D supershapes using computer-aided design (CAD) system. The superformula introduces six defining parameters; a, b, m, n1, n2, and n3 that influence the curvature and symmetry of closed or opened curves. In order to achieve this objective, the six parameters will be modified to permit the generation of various supershapes. In this study, the evolution of shapes will be observed starting from the concept of ellipse. MATLAB software is used to generate the supershapes in polar form through a series of coding and the coordinates produced which is in X and Y axes will be imported into Solidworks software. to perform all the solid modeling activities. In this study, an impeller, airfoil and propeller blade were generated using Gielis Superformula with the aid from Solidworks features. The results produced are almost satisfying and achieved the objectives and the proposed approach can successfully generate an optimum design of various supershapes.

TABLE OF CONTENTS

CONTENTS	PAGE

CHAPTER 1   INTRODUCTION