COMPUTER-AIDED DESIGN (CAD)
OF
DC MACHINE USING MATLAB

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UNIVERSITI TEKNOLOGI MARA

UNIVERSITI
TEKNOLOGI
MARA

MOHD SUHAIDI BIN WAHIB
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR DARUL EHSAN

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Mohd Suhaidi B. Wahib

UITM Shah Alam

ABSTRACT

In recent years, product life cycle has decreased and demands for new products have emerged due to competition, modern industrial needs, and rapidly changing technology. This has necessitated changes in design, development, and manufacturing processes to improve quality and efficiency and to reduce cost. Computer-aided design (CAD) helps to meet this challenge in the design evaluation and final product design stages. This paper presents the development of interactive software for the optimal design of dc machine using Matlab. These will give the idea to the industry for manufacturing the electric machine especially dc machine easily.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Electric machines can be broadly classified into two categories on the basis of how they produce torque - electromagnetically or by variable reluctance. In the first category, motion is produced by the interaction of two magnetic fields, one generated by the stator and the other by the rotor. Two magnetic fields, mutually coupled, produce an electromagnetic torque tending to bring the fields into alignment. The same phenomenon causes opposite poles of bar magnets to attract and like poles to repel. The vast majority of motors in commercial use today operate on this principle. These motors, which include DC and induction motors, are differentiated based on their geometries and how the magnetic fields are generated. Some of the familiar ways of generating these fields are through energized windings, with permanent magnets, and through induced electrical currents.

The dc machines are versatile and extensively used in industry. A wide variety of volt-ampere or torque-speed characteristics can be obtained from various connections of the field windings. Although a dc machine can operate as either a generator or a motor, at present its use a generator is limited because of the widespread use of ac power. The dc machine extensively used as a motor in industry. Its speed can be controlled over a wide range with relative ease. Large dc motors (in tens or hundreds of horsepower) are used in machine tools, printing presses, conveyors, fans, pumps, hoists, cranes, paper mills, textile mills, rolling mills and so forth. DC motors still dominates as traction motors used in transit cars and locomotives. Small dc machines (in fractional horsepower rating) are used primarily as control devices-such as tachogenerators for speed sensing and servomotors for positioning and tracking.