FINAL YEAR PROJECT REPORT

ADVANCED DIPLOMA IN MECHANICAL ENGINEERIMG

SCHOOL OF ENGINEERING

MARA INSTITUTE OF TECHNOLOGY (I.T.M)

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COMPUTER AIDED ANALYSIS OF PLANAR LINKAGE MECHANISMS

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ABSTRACT

The main objective of this project is to prepare a suitable program on kinematic analysis of planar four bar linkage and planar slider crank mechanisms. These mechanisms have been selected because they form the basic elements of most machines and because they are easily adaptable to the teaching of fundamental kinematic principles. Once these principles are fully understood, it is comparatively easy to apply them to the analysis of more complex mechanisms.

The computer programs listed in this report are based on vector method and calculus method. The programs are written in FORTRAN LANGUAGE. Throughout our work, we try as much as possible to make these programs simpler and easy to be understood.

To apply these programs, typically, the link lengths of the mechanism,the crank angle and the angular velocity must be known. From these data, the required velocities and accelerations can be computed for any specified angular position of the crank in its motion cycle.

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1.0 INTRODUCTION

The major goal of the engineering profession is to design and manufacture marketable products of high quality. Today's industries are utilizing computers in every phase of the design, management, manufacture, and storage of their products. The process of design and manufacture, beginning with an idea and ending with a final product, is a closed loop process. Almost every link in the loop can benefit from the power of digital computers.

1.1 Computer- Aided Analysis (CAA)

The computer-aided analysis process(CAA) allows the engineer to simulate the behaviour of a product and modify its design prior to actual production. In contrast, prior to the introduction of CAA, the manufacturer had to construct and test a series of prototypes, a process which was not only time consuming but also costly. Most optimal design techniques require repetitive analysis processes. Although one of the major goals of an automated factory is computer-aided design, computer aided analysis techniques must be developed first.

CAA techniques may be applied to the study of electrical and electronic circuits, structures, or mechanical systems. The development of algorithms for analyzing electrical circuits began in the early days of