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**IMPLEMENTATION OF FINITE ELEMENT  
PROGRAM FOR TWO-DIMENSIONAL  
PLANE STRAIN ANALYSIS**

**BY:**

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## ABSTRACT

The Finite Element Method is a powerful tool for the approximate solution of differential equations governing different kind of physical phenomena. Its use in industry and research is extensive and indeed it could be said that without it and its handmaiden (the computer), many problems would be incapable of solution.

This presentation is based on an effort to implement Finite Element program on IBM PC Micro Computer at the School of Engineering, Institut Teknologi Mara (ITM), Shah Alam, Selangor.

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## 1.1 GENERAL.

In early stages, it is necessary to be able to predict the behaviour of components when in service. To the designer, three methods are available. Firstly, experiments can be performed on either to prototype or model components subjected to the required service conditions. Important design parameters need to be established and applied to the real design situation. Secondly, design codes can be used. However, the procedures are often restricted to simple component geometry and loadings. Finally, analytical method has the advantage in which the results can be obtained quickly. Simplifying assumptions may have to be made and quite often closed form analytical solution can only be obtained for simple component geometry. As an alternative, a more sophisticated computational method, such as finite element method can be used (Zienkiewicz (1971)). It is the computational method that are becoming popular nowadays. The main reasons are that the cost of experiments, which includes equipment, material and manpower, is high compared the computer time and paper. Also, computers are becoming more powerful and this allows results to be obtained more quickly.