

FINITE ELEMENT ANALYSIS OF STRUCTURES

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Abstract . The application of finite element method is analytical when solutions can not be applied for deeper study analyzes static, dynamic or other types of requirements in different points of the structures .In practice it is necessary to know the behavior of the structure or certain parts components of the machine under the influence of certain factors static and dynamic . The application of finite element in the optimization of components leads to economic growth , to increase reliability and durability organs studied, thus the machine itself.

INTRODUCTION

The study of structures by finite element in this case is going through two major phases : preprocessing and postprocessing . Most finite element software working in an integrated way with the CAD or independent (import geometry via file include : village , IGES , DXF or other) these phases preprocessing and postprocessing .

1. Preprocessing is the stage where introduce all the data on geometry, loads, material and type of analysis that will be subject structure .

Analysis of the structural mechanics are:

a) static- analysis that will determine the displacements , stresses, deformatietc , under the action of forces in static state remains constant over time.

b) dynamic - analysis involves determining tensions or deformation under the influence of time-varying loads .

It also can study the structure of frequencies and response in a time with the possibility of process optimization . After determining a range for optimal parameter value or go to the optimization process itself that determines the value of an objective function composed of two parameters that serve a more accurate solving process optimization through process Global sensitivity . Going through a number of iterations yield optimal objective function value which must be finding value .

2. Postprocessing - is the phase in which a structure determinants click: stress, displacement, frequency, etc.

TYPES OF ELEMENTS USED

Discretization process is an important stage structure and results analysis specifies points and directions of obvious usefulness ulterioara.Este knowledge of mechanical stress condition for the piece not to break under the action of tasks that must face during operation from occurring deficiencies majores in consecintainca the design stage can make changes.

Although a solution is iterative and is based on computing power (working memory of the computer-software used) finite element method offers a wide opportunity to study mechanical design structures regardless of their complexity.

The approximation comes from discretization of structure in finite element calculation errors and the related assumptions. These miscalculations can be caused (excluding finite element software) for: hardware and operator.

Hardware-soft errors generated by the operating system are caused by inappropriate or programs used for the calculation. Used in the range of finite element analysis programs can remember : preprocessor - processor - Patran - Nastran compiler ; CosmosM program integrated as a compiler ; Ansys , Pro / eEngineering - ProMechanica etc.

Errors generated by the operator - mesh data structure element type used inadequate or geometric pattern .

FEM is currently the most widely used numerical method for calculating structures as applied to complex structures regardless of geometry and how to apply for static , dynamic, linear elastic thermal or nonlinear regime that required assembly and limiting the application is given the possibilities of computing .

REFERENCES

1.Zienkiewicz, Taylor La methode des elements finit, Anfor, Paris, 1991