

Structural variation theorems extended to integrated force method for the analysis of skeletal structures

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SUMMARY

In this paper, a general formulation of the theorems of structural variation and integrated force method is briefly presented. Application of the structural variation theorems is extended to form a procedure for modified (varied) structures. In the present method, the governing equations of the integrated force method of the main structure are used as structural variation theorem tools to compute forces and displacements of the modified pin-jointed trusses and rigidly jointed frames. The computational time of the integrated force method, dual integrated force method and the present method is also compared to show the abilities of the present approach. Examples are presented to illustrate the procedure of the present approach compared with the new analysis of a modified structure. Copyright © 2008 John Wiley & Sons, Ltd.

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1. INTRODUCTION

The force method of structural analysis, in which the redundant forces are used as unknowns, is appealing to engineers, since the properties of members of a structure most often depend on the member forces rather than joint displacements. This method was used extensively until 1960. The

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