ENGLISH SUMMARY

Aalto, Jukka, A NEW NUMERICAL SOLUTION FOR SAINT VENANT TORSION

Solution of the Saint Venant torsion problem with a least squares finite element technique is considered. Basic unknowns in the method are the torsional stresses. Post-processing techniques for obtaining the warping function and the stress function are developed.

Aula, Antti, THE METHOD OF AN EFFICIENT MASS IN DYNAMICS OF NONLINEAR STRUCTURES

In this article a new method named as "the method of an efficient mass" has been presented. It can be used in dynamic analysis of structures together with a linear acceleration method as a direct integration method over the time domain.

The method of an efficient mass considers an elastic structure as a system of particles. It has been shown that in both cases there can be found a similar formulation for accelerations. Thus, the theory for an elastic structure considers not only the elastic displacements but also significant geometric movements of nodes: translation and rotations of the structure.

Some geometrically linear and nonlinear examples have been calculated by the computer program GERDA I by the author.

It seems that the method has quite a large field of applications.

Further research will consider the stability and accuracy of the method. In Appendix there are some comments about these problems. During this work GERDA I has been changed for 3-dimensional purposes, like the analysis of prestressed suspension roofs.

Niemi, Jarmo, WEIGHTED RESIDUAL APPROACH TO SINGLE STEP METHODS. SS5 FAMILY OF METHODS

A general family of methods for a single step time marching scheme for use in structural dynamic equations is presented. This family of methods, called SS5 methods, embrace collocation and α-methods. Also many of the SSpj algorithms are included. Corresponding parameter values of SS5 methods for these methods are presented.

Tuominen, Pentti, DETERMINATION OF THE STIFFNESS COEFFICIENTS OF AN ARCH BY THE FINITE DIFFERENCE METHOD

Two methods for computing the stiffness coefficients of planar arches are presented. The first method is a recursive shooting method which is based on the difference approximations of normal force and bending moment of an arch. This method is aimed for use with microcomputers. The second method is based on the difference form of the equilibrium equations of an arch. It is an extension of

the author's article published earlier in this journal (Vol. 17 No. 3, 1984). A Richardson extrapolation is applied with both methods in order to improve the accuracy. Two circular arches have been analysed. The results agree well with the analytical ones. The methods and the two solution types are compared shortly with each other.

Virtanen, Hannu, Mikkola, Martti, GEOMETRICALLY NONLINEAR ANALYSIS OF SPACE FRAMES

In this article a method for the computer analysis of geometrically nonlinear behaviour of space frames is presented. Large displacements and rotations of joints and members are allowed for but the local deformations of the members are assumed to remain small. In an individual member axial, bending and torsional deformations are taken into account. The beam-column theory is applied to the members. The interaction of the axial force and the bending moment is included but the torsion is treated independent of other actions. Incremental solution procedures have been used. The modified Newton-Raphson iteration has been used at each load step and, for overcoming limit points, it is combined with the constant-arc-length-method. Two examples have been analysed with the implemented program. Results have been compared to experimental and numerical results obtained elsewhere.