

## ENGLISH SUMMARY

### *Kölliö, Jorma* PRESENTING CONTOUR CURVES WITH CONTROLLED ACCURACY USING RECURSION

Graphic presentations of FEM-analysis do serve primarily in checking input data and in visualizing the results. The user can quickly find important regions of the model from output plots. Often, however, exact values have to be found from output listings or files. Versatile, reliable and accurate graphic presentations reduce the need to read and store output files. They are also excellent material for desk top publishing systems, which are getting more and more popular today. In this paper a contour algorithm, which allows user controlled accuracy, is presented. Its additional aims are to produce contour curves by using as few vectors as possible and also to save computer resources. The algorithm is straight forward to code. Even languages, not allowing recursion can be used because in practical cases recursion does not extend more than between 3 - 6 levels deep. Some output variables and capabilities, which are not usually supported by general purpose codes, are also described.

### *Malmi, Simo* FREE VIBRATION OF SANDWICH BEAM

The equations of sandwich beam for free vibration are derived when effects of bending stiffness of faces, shear stiffness of core, longitudinal and transverse inertia forces and rotatory inertia are taken into account. Also formulation of eigenfrequencies and modes by exact finite element method using exact shape functions is presented. Theory is valid exact for two-layered and three-layered symmetric sandwich beam and approximately for multi-layered sandwich beam.

### *Vepsäläinen, Ari* IDENTIFICATION OF STRUCTURES WITH VIBRATION MEASUREMENTS

Some most important methods of estimation of structural parameters are presented. The identification methods are divided into two classes: those that use modal analysis to estimate parameters and those that estimate parameters from state space model. The prediction error method and pseudolinear regression are presented. Also some recursive methods and some practical algorithms are presented.