The design and development of the postprocessor for

2D S-FEM analysis software

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Abstract

The development of postprocessor module for smoothed finite element method (S-FEM) which has been widely used for solving various engineering problems is very essential. In the paper, a 2D post-processing module of the S-FEM analysis software is designed and implemented. Using the fashion of combining binary and database files for storage, the binary files can improve the efficiency of reading and writing for temporary data, and database files is used to store important data to improve the readability of the text. In the data processing, the parallel techniques is applied to improve the computational efficiency, and the stress and strain distribution can be obtained through the interpolation of the required area. The postprocessing module can fulfill the following functions: Reading or writing the text files and database files about the problem boundary information and the meshes, displaying all the nodes or triangular elements and seeking a special node or triangular element in term of the required ID by users, sketching elastic area and plastic area with different icons, plotting the displacement vectors, processing the stress and strain curves, creating sections and then drawing the curves of displacements, stresses and strains. In order to show the strain and stress solutions more clearly and smoothly, three color modes: contour lines, color fields and smoother color fields are used to display the strain and stress distribution. Besides, we employ the visual processing module to make our interface friendlier, which includes setting the color, the type and the width of the lines, setting the shape of nodes, elements and vectors, and so on.

Keywords: Image processing; Smoothed finite element method; Searching algorithm; Color mode