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Web-based post-processing visualization system for finite element analysis. (English)

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Summary: We propose and implement a website of post-processing system for finite element analysis (WebDFEA). Finite element analysis is a computer-aided engineering tool and is popular for static/dynamic structure analysis. It includes three processing systems where post-processing system is to graphically demonstrate the analysis result of a structure model analyzed by finite element method. WebDFEA performs as a website. It is cross-platform because it can auto-detect a client computer platform and auto-download proper OpenGL API for drawing computer graphics. It can draw precise graphics on webpage which can be free controlled by the mouse as a manner in professional software. A database server is involved to store finite element model data and its analysis result. The graphic user interface (GUI) of WebDFEA is a flexible GUI comprising three parts: the switch buttons designed by HTML, the display board and the color bar both developed in Java. The three components are independent and cooperative with each other. They can be recombined without running errors for different purposes. A ship hull section with half a hatch is chosen as the study case to test WebDFEA website. Its finite element model comprises 11442 triangle elements (shapes). The timeframe starting when WebDFEA is connected to the end when the model is demonstrated is acceptable.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
74K99 Thin bodies, structures
68U05 Computer graphics; computational geometry (digital and algorithmic aspects)

Keywords:

OpenGL; database; graphic interface; ship hull section

Software:

OpenGL; MANIP; WebDFEA; Web-FEM

Full Text: DOI

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