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Re-analysis method for inversion of block matrix based on change threshold. (English)

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Summary: In the mechanical design industry, it is very time-consuming to convert actual engineering design problems into finite element models, and it is repeatedly modified during the product design process. Each time the structure is modified, computer simulation analysis is repeated, and the product development cycle becomes longer. Therefore, in this paper, a re-analysis theoretical method based on the inversion of the block matrix based on the change threshold is proposed to quickly obtain responses with different accuracy after the structure is modified according to the initial analysis. By modifying the size of the change threshold, the accuracy and calculation time of the reanalysis results are controlled. This reanalysis method shortens a lot of calculation time under the premise of controllable response accuracy. In this paper, numerical calculations are given to show the accuracy of the response under different thresholds, and the efficiency of this method is proved by the finite element model under the same accuracy.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
65F05 Direct numerical methods for linear systems and matrix inversion

Keywords:

reanalysis; change threshold; block inversion

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