

The post-processed Galerkin method in structural dynamics. Improving results of low-dimensional elements at almost no cost

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In this paper a post-processed Galerkin finite element method based on hierarchical interpolations is presented. The method makes use of two stress hybrid or, alternatively, enhanced strain finite element formulations; a low-dimensional four-node and a high-dimensional nine-node one. The results of the four-node element are improved based on a specific form of a low-cost post-processed method. The nine-node interpolations are only used to elaborate the linear part of the equation defining a constant matrix to be inverted only ones during the whole computational process. The non-linear part is evaluated using the already known four-node solution. Altogether the method provides means for a very low-cost improvement of low-dimensional solutions. It is the fact that the kinematical fields are improved to higher orders which makes the method effectively handle large scale problems in structural dynamics.