Modal finite element correlation for Computer Aided Engineering Education.

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Abstract

The main challenge faced by many mechanical engineering educators is the implementation of real solutions during their courses. One alternative can be a project-based learning, where the students can be engaged in the development and analysis process currently applied in the industry. This kind of teaching process not only can be used to improve the quality of teaching-learning process but also the students can have opportunities to solve real engineering problem. This paper therefore reports a project-based learning implemented in mechanical engineering courses given in bachelor´s and master's degree. The component under evaluation has been selected considering the student's interest, this criterion was also taken to involve several students into a real project process to their learning development. During the semester have been delivered activities to solve the same problem using different approaches based on student´s skills. This procedure can be replicated for students and teachers by following steps. To begin this process, the first step is present the theoretical basis for modal analysis. The second step is to apply theorical knowledge to structure a numerical finite element model. Then, it is used Hypermesh, Optistruct and HyperView software to solve and simulate. The final step was to perform experimental using a three-dimensional scanning vibrometer on 60 samples. It is well noted that the implementation of engineering software commonly used at the industry would increase students' confidence. This allows students to perform real problem-solving activities to develop outcomes as establish goals, plan task, meet deadlines. Therefore, this paper shows an engineering solution process to provide a learning alternative to teach the modal finite method solutions correlation with experimental solutions.

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