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RESEARCH ARTICLE

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An educational software suite for comprehensive learning of Computer-Aided Engineering

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Abstract

The learning of Computer-Aided Engineering (CAE) usually involves practical computer lessons on the use of CAE software. Software packages suitable for learning should be user-friendly and accessible, with an affordable cost. However, the CAE freeware and proprietary software available in the market are relatively difficult to use for novices. Furthermore, most proprietary software packages are very costly, hindering the access of learners. In this study, a CAE freeware suite, CAE 3D, has been developed for supporting the learning of CAE technology. CAE 3D contains four modules for analyzing 3D solid mechanics, heat transfer, and mechanical vibration problems by the finite element method, and 3D fluid dynamics problems by the finite volume method. Unlike most CAE freeware applications, the user interface of CAE 3D is a purely graphical user interface instead of containing some text-based user interfaces. As CAE 3D is user-friendly and capable of analyzing various types of engineering problems, it is suitable for use as a learning tool of CAE. For example, learners can adjust parameters, such as geometry, material properties, and/or boundary conditions, to explore the effects of a given setting on the CAE results. This article explains the CAE learning process, development of CAE 3D software and application of CAE 3D to university classrooms.

