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Elements of an object-oriented fem++ program in c++

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Abstract

A typical finite element analysis program on the basis of a Timoshenko beam has been developed and implemented using the object-oriented programming language C++. The classes $\tilde{\text{Vector}}^{\text{TM}}$ and $\tilde{\text{Matrix}}^{\text{TM}}$ provide a symbolic notation by way of operator overloading and polymorphic methods, which leads to clearly structured programs. Data encapsulation by objects allows an easier verification and maintenance than by procedural languages. The class concept and the concept of inheritance improve data management and modularization, which are shown by examples of managing node data and calculating the element stiffness matrix.



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