

# **ABSTRACT**

## **STEP-Based CAE/CAO Information Exchange**

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In the product design process computer-aided engineering and optimization tools are widely utilized in order to reduce the total development time and cost. Since several simulation tools are involved in the process, information losses, omissions, or errors are common and the importance of seamless information exchange among the tools has been increased. Previous works focused on the direct translators between popular design tools, but the establishment of the neutral format provided easy maintenance and extendibility.

In this study ISO STEP standards are adopted to represent the neutral format for CAE/CAO information exchange. The schema of AP209 defined the information of finite element analysis is used and the new schema is proposed to describe the

information of structural optimization based on the STEP methodology. The schema is implemented by EXPRESS, information modeling language, and ST-Developer is employed to generate C++ classes and STEP Rose Library by using the schema denoted.

To substantiate the proposed approach, the information access interfaces of the finite element modeling software (FEMAP), structural optimization software (GENESIS) and in-house topology optimization program are developed. Examples of the size optimization of a ten-bar truss and topology optimization of a bridge are shown to validate the information exchange of finite element analysis and structural optimization using STEP standards