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基于Open CASCADE的机电产品三维结构的集成与准确建模

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Title: Integrated and Accurately Modeling of Electromechanical Products Three Dimensional Structure Based on Open CASCADE

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关键词: 产品数据交换标准; 中间数据格式; Open CASCADE; 机电产品; 三维造型

Keywords: STEP; IDF; Open CASCADE; electromechanical product; three-dimensional modeling

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摘要: 现有的计算机辅助设计工具虽然在机械、电子各自领域已经十分的成熟,但在机电集成设计和信息交互方面还不是十分的有效,特别是在机电产品三维结构的集成建模上存在很大的局限性.为了寻求一种将机电模型准确造型的方法,基于Open CASCADE(OCC)三维造型内核开发了一个机电集成设计平台,在机械设计方面通过对产品数据交换标准(STEP)文件的读写与机械计算机辅助设计(MCAD)配合支持产品机械结构的造型设计;在电气设计方面实现中间数据格式(IDF)中性文件的读写与电子计算机辅助设计(ECAD)配合支持产品电气结构的设计及三维模型的自动生成;通过系统自带的三维电子元件数据库搜寻元件准确的三维模型替换IDF文件中描述的简单元件模型,最终实现机电产品三维结构的集成与准确建模,该模型有效提高了机电产品的设计效率及在后续产品的仿真分析验证及制造所需数据的准确性.模型可通过输出接口以STEP文件格式导出,供其他分析软件使用.

Abstract: Although existing computer aided design tools has been very mature in mechanical and electronic fields,it is not very effective in the electromechanical

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integration design and information interaction, it especially has a lot of limitations in the three dimensional structure integrated modeling of electromechanical products. In order to seek a method to accurately model electromechanical model, this paper develops an electromechanical integrated design platform based on the Open CASCADE three dimensional kernel. This platform and supports the modeling design of mechanical product structure through STEP file reading and writing cooperated with MCAD in mechanical design; it supports electrical products structure design through achieving IDF neutral file reading and writing and automatically generating three dimensional model cooperated with ECAD in electrical design; it searches accurate electronic three-dimensional models through three-dimensional electronic components database to replace simple electronic model described by IDF file, finally achieves integrated and accurately modeling of electromechanical products three dimensional structure. This model effectively improves the electromechanical product design efficiency and the accuracy of the data needed in product simulation analysis, validation and manufacturing. The model can be exported to STEP file through the output interface, then it can be used by other analysis software

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