GEOUNED

UNED, partially under contractual activities of F4E, has developed GEOUNED: a software tool that converts engineering CAD models into Monte Carlo radiation transport models, with the ability to convert back to CAD. It is an open-source tool, accessible, easy-to-install, and uses Open CASCADE as the CAD engine and FreeCAD as the interface for python scripting. GEOUNED can handle decomposition and automatic void generation algorithms, and is capable of tackling various problems in geometry conversion. F4E is currently supporting its transformation from a research tool used by a small group to a widely adopted code used within the broader neutronics community.

The technology

GEOUNED is a software tool that transforms CAD models into Monte Carlo (MC) radiation transport models, with the ability to convert back to CAD. It is an open-source tool using Open CASCADE as its geometry engine and FreeCAD as its Python API. It aims to boost EU's autonomy in nuclear analysis tools.

Decomposition and automatic void generation algorithms

The software stands out for its features like decomposition and automatic void generation, especially beneficial for intricate 3D models in fusion neutronics like the ones found at ITER. The decomposition algorithm allows to decompose complex CAD solids into parts that can be converted to Monte Carlo formats. On the other hand, automatic void generation is an innovative feature which avoids human errors when defining the existent space between components.

A robust, flexible, and easy-to-install tool

It has been developed as a Python API, to allow scripting capabilities for task automation. It uses open-source codes such as Open CASCADE and FreeCAD, making it an easy-to-install and more accessible tool.

Collaboration opportunities

GEOUNED can be implemented for several neutronic calculations. It has been used in different projects, covering almost all the fusion-related facilities. Possible application areas include every field working with radiation transport activities.

Fusion for Energy Technology Transfer Programme

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