

基于 FLAC 软件实现非结构化网格拉伸快速建模方法

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摘要: FLAC3D 软件中的 Extrusion 工具能够通过拉伸结构化网格快速生成三维模型, 但无法对包含非结构化网格的模型进行拉伸。结构化网格通常只适用于形状规则的图形, 对于不规则的图形通常以非结构化网格为主, 这导致 FLAC3D 软件在建模能力方面受到一定限制。针对上述不足, 本文利用 FLAC2D 软件可以快速导入背景文件并高效构建二维模型的特点, 对 FLAC2D 模型文件中的节点信息、单元信息、分组信息, 进行坐标变换和平移, 分别计算出拉伸后形成三维模型的节点信息、单元信息、分组信息, 并依据 FLAC3D 模型文件的编码规则, 采用 C 语言研发了 FLAC2D to FLAC3D 的接口程序, 实现了从 AutoCAD-FLAC2D-FLAC3D 快速建模。该方法不仅能实现从复杂的二维剖面到 FLAC3D 假三维模型的快速构建, 还为 FLAC2D 模型文件导入 FLAC3D 模型文件提供了切实可行的解决方案, 同时实现了基于 FLAC 软件非结构化网络快速拉伸建模, 从而扩展了 FLAC3D 的建模能力和应用范围, 提高了建模效率。

关键词: FLAC Extrusion 非结构化网格 快速建模

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The Rapid Modeling Method of Unstructured Mesh Extrusion Based on FLAC Software

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Abstract: The Extrusion tool in FLAC3D software enables rapid generation of three-dimensional models by stretching structured grids, but it cannot stretch models containing unstructured grids. Structured grids are typically only suitable for regular-shaped geometries, while irregular geometries are usually represented by unstructured grids, which limits FLAC3D software's modeling capabilities. To address this limitation, this paper utilizes the ability of FLAC2D software to quickly import background files and efficiently construct two-dimensional models. It transforms and translates the node information, element information, and grouping information in FLAC2D model files, calculates the node information, element information, and grouping information of the stretched three-dimensional model, and develops an interface program from AutoCAD-FLAC2D-FLAC3D using the C language based on FLAC3D model file encoding rules. This enables rapid modeling from complex two-dimensional profiles to FLAC3D pseudo-three-dimensional models. The method not only provides a feasible solution for importing FLAC2D model files into FLAC3D model files but also realizes rapid stretching modeling of unstructured networks based on FLAC software, thereby expanding the modeling capabilities and application range of FLAC3D and improving modeling efficiency.

Keywords: FLAC, extrusion, unstructured mesh, rapid modeling