

研究进展与工程实录

## 基于Delaunay构网的地层3D TEN模型及建模

吴江斌<sup>1</sup>, 朱合华<sup>2, 3</sup>

(1. 华东建筑设计研究院, 上海 200002; 2. 同济大学 岩土工程重点实验室 上海 200092; 3. 同济大学 地下建筑与工程系, 上海 200092)

收稿日期 2004-6-1 修回日期 2004-12-28 网络版发布日期 2007-2-15 接受日期

**摘要** 构建真三维的地层模型是地质学、三维GIS、科学可视化及工程应用领域共同关心的课题。在总结当前的三维地层建模理论与方法的基础上, 提出了地层的真三维四面体模型。该模型将地层钻孔数据离散为点源性息, 采用Delaunay四面体化算法构建三维地层, 并对地层尖灭、断层等突变信息的处理进行了探讨。最后给出了该方法在典型地层和工程应用中的实例。该模型体现了TEN便于存储、快速可视化等优点, 建模方法则充分利用计算机。

**关键词** [数值分析](#) [Delaunay三角形](#) [四面体网络结构](#) [地层](#)

分类号

## 3D TEN MODEL OF STRATA AND ITS REALIZATION

WU Jiang-bin<sup>1</sup>, ZHU He-hua<sup>2, 3</sup>

(1. East China Architecture Design Institute, Shanghai 200002, China;

### Abstract

The true three-dimensional strata modeling is a common issue for geology, three-dimensional GIS, scientific visualization and engineering application. After introducing and summarizing the theory and method of three-dimensional geology modeling, a true three-dimensional tetrahedron network(TEN) model of strata is proposed. The model represents three-dimensional stratum with a series of tetrahedrons, which can provide the best flexibility to fill regions defined by simplified boundary elements(i.e., edges in two-dimensional, triangle in three-dimensional). Geological exploration hole is the main information for engineers to know the soil strata. Geological exploration hole are abstracted as scattered point data. Each point is the demarcation point between two different strata and a topologic dimidiate datum structure is designed. Based on these scattered points abstracted from geological exploration hole information, the three-dimensional TEN stratum model is reconstructed by Delaunay triangulation algorithm. The modeling method can disposal broken mutation such as failure and dwindle. At last, some assumed classic strata and strata of a practice project are constructed by the method. The model has the advantage of convenient for storing and fast visualization. The characteristic of construction method is taking advantage of computer more effectively. Because the model strata are represented by tetrahedron, the strata model can also be used as the FEM mesh and convenient for special analysis, such as settlement or seepage of soil.

**Key words** [numerical analysis](#) [Delaunay triangulation](#) [tetrahedron network\(TEN\)](#) [strata](#)

DOI:

通讯作者

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(101KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“数值分析”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [吴江斌](#)
- [朱合华](#)
-