



## 论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.34 No.6 Dec.2003

 [PDF全文下载]  [全文在线阅读]

文章编号: 1005-9792(2003)06-0699-05

## 土钉支护危险滑动面搜索的混沌优化方法

祝方才<sup>1</sup>, 彭振斌<sup>1</sup>, 隆威<sup>1</sup>, 刘光辉<sup>2</sup>

(1. 中南大学地学与环境工程学院, 湖南长沙, 410083;  
2. 株洲工学院土木工程系, 湖南株洲, 412008)

**摘要:** 将混沌优化方法运用于土钉支护危险滑动面的搜索. 基于圆弧滑动面模型, 选择滑动面与基坑的交点和滑弧所对应的圆心角为优化变量, 以安全系数为目标函数, 利用变尺度混沌优化方法建立了危险滑动面搜索的混沌优化数学模型. 以某深基坑工程为例, 利用该方法得到了土钉支护各个施工阶段的危险滑动面, 比较了不加钉、本步已加钉和本步尚未加钉3种工况下的安全系数. 研究表明: 对于每一施工步, 第1种工况安全系数最小, 第3种工况安全系数最大, 第2种工况安全系数居中; 变尺度混沌优化方法效果主要取决于搜索次数, 其次为载波次数; 混沌优化方法具有较强的稳健性, 是一种有效的危险滑动面搜索方法, 并可推广用于非圆弧滑动面搜索.

**关键字:** 混沌优化; 土钉支护; 滑动面; 稳定性; 稳健性

## Search of dangerous slide surface of soil nailed wall through chaotic optimization approach

ZHU Fang-cai<sup>1</sup>, PENG Zhen-bin<sup>1</sup>, LONG Wei<sup>1</sup>, LIU Guang-hui<sup>2</sup>

(1. School of Geoscience and Environmental Engineering, Central South University, Changsha 410083, China;  
2. Department of Civil Engineering, Zhuzhou Institute of Technology, Zhuzhou 412008, China)

**Abstract:** Search of dangerous slide surface of soil nailed wall is carried out using chaotic optimization method. Based on circular slide surface assumption, with safe coefficient as goal function, through selecting coordinates of two points of intersection of slide surface with a soil nailed wall and central angle as variables of optimization, a chaotic optimization model is established. With certain deep pit project as example, dangerous slide surfaces of all construction steps are gotten using this method. Safe coefficients of 3 kinds of operating modes including not adding nails, already adding nails of this step and not adding nails of this step, are compared. For each construction step, safe coefficient of the first kind of operating modes is minimum, that of the third kind is the biggest, and that of the second kind is in the middle. Effects of mutative-scaled chaotic optimization depend mainly on search frequency, and the carrier frequency is a less important influencing factor. Chaotic optimization method, which has strong robustness, is an effective method in search of circular dangerous slide surface, and it can be spread to search non-circular dangerous slide surface.

**Key words:** chaotic optimization; soil nailed wall; slide surface; stability; robustness

# 有色金属在线

## 中国有色金属权威知识平台

版权所有：《中南大学学报(自然科学版、英文版)》编辑部

地 址：湖南省长沙市中南大学 邮编： 410083

电 话： 0731-88879765 传真： 0731-88877727

电子邮箱： zngdxb@mail.csu.edu.cn 湘ICP备09001153号