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基于GIS和最小势能原理的斜坡稳定性三维分析

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摘要 借助GIS的数据管理和空间分析功能，提出了一个基于最小势能原理的斜坡稳定性三维计算方法。最小势能原理针对滑面和滑体进行系统分析，从而避免了采用常规方法计算所需要的各种假设条件。从三维地质模型中提取滑体几何参数和物理力学参数，可以很方便地计算任意形态滑面的滑坡稳定性系数，三维与二维计算的结果比较证明了该方法的合理性和适用性。

关键词 数值分析；最小势能原理；斜坡稳定性三维分析；三维地质模型

分类号

3D STABILITY ANALYSIS OF SLOPE BASED ON GIS AND PRINCIPLE OF MINIMUM POTENTIAL ENERGY

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Abstract

Making the best of data management and spatial analysis of GIS，this paper puts forward a method for 3D stability calculation of slope based on the principle of minimum potential energy；of which the adaptation to systematic analysis of sliding surface and mass，assumptions in traditional methods are avoided in this one. Geometric and mechanical parameters，which can be easily acquired from 3D geoscience model，are absolutely necessary for stability index calculation of slope with various shapes. Its rationality and fitness are proved by comparison of 2D and 3D calculation results.

Key words numerical analysis；principle of minimum potential energy；3D stability analysis of slope；3D geoscience model

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