力学学报 2005 37 (6): 729-736 ISSN: 0567-7718 CN: 11-2063/O3

广义非线性强度理论在岩石材料中的应用

路德春, 江强, 姚仰平

北京航空航天大学土木工程系

收稿日期 修回日期 网络版发布日期 接受日期

摘要 在已提出的广义非线性强度理论的基础上，结合岩石材料的力学特性，建立了岩石广义非线性强度理论，该理论在π平面上的破坏函数为介于SMP准则和Mises准则之间的光滑曲线，在子午面上的破坏函数为幂函数曲线. 通过已有不同岩石的真三轴试验数据对岩石广义非线性强度理论的验证表明，岩石广义非线性强度理论可以广泛地适用于各类岩石，描述其π平面上及子午面上的非线性强度特性；并利用5种不同类型岩石的真三轴试验结果对岩石广义非线性强度理论和Hoek-Brown准则进行比较, 反映了所提岩石广义非线性强度理论的优越性.

关键词 岩石,广义强度理论,非线性,中主应力,真三轴试验数据

分类号 0346，TU45

Generalized nonlinear strength theory for rock materials

,,

北京航空航天大学土木工程系

Abstract

Based on generalized nonlinear strength theory that has been proposed by author, combined with mechanics characteristics of rock materials, a generalized nonlinear strength theory for rock is proposed. The failure function of the theory is a smooth curve between SMP criterion and Mises criterion in the π plane and is a exponential curve in the meridian plane. The generalized nonlinear strength theory for rock is validated by the triaxial compression test data for different rocks that have been published. The generalized nonlinear strength theory for rocks can be widely applied to all kind of rocks and can describe the characteristics of nonlinear strength in the π plane and the meridian plane. Compared with the Hoek-Brown criterion using test results of five different rock types under the three-dimensional stress states, the superiority of the nonlinear strength theory for rock materials has been embodied in this paper.

Key words 岩石 广义强度理论 非线性 中主应力 真三轴试验数据

DOI:

通讯作者 dechun@buaa.edu.cn