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# Damage evolution and crack propagation in rocks with dual elliptic flaws in compression

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## Abstract

To give an insight into the understanding of damage evolution and crack propagation in rocks, a series of uniaxial and biaxial compression numerical tests are carried out. The investigations show that damage evolution occurs firstly in the weak rock, the area around the flaw and the area between the flaw and the neighboring rock layer. Cracks mostly generate as tensile cracks under uniaxial compression and shear cracks under biaxial compression. Crack patterns are classified and divided. The relationship between the accumulated lateral displacement and the short radius ( $b$ ) is fitted, and the equation of crack path is also established.

## Key words

Damage evolution; Crack propagation; Elliptic flaw

## 1 Introduction

As a common complicated geological mass, rocks are encountered in most engineering practices. In rocks, inhomogeneities such as flaws, joints and mineral grains or particles are ubiquitous, which play a key role in the

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