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Application of Rough Set Feature Selection in the Hazard Assessment of Debris Flow

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Key words: rough set; debris flow,attribute reduction,value reduction

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Introduction

The main content of debris flow hazard assessment is to evaluate the degree of risk of debris flow, it comprehensively reflected debris flow activity and the destructive capacity of disaster.In1988 Takahashi of Japan studied relations between the damage to buildings and the thickness of debris flow deposits.Kubota, in Japan in 1990, also from the effective rainfall of short duration and rainfall intensity to carry out research on debris flow hazard.The study of domestic debris flow risk assessment started from 1980s. The paper "on classification of waste stream", Wang Lixian published in 1982, first divided the risk of debris flow.Since then many scholars on this issue maked a useful discussion.To present research results, In the utilization of method,such as neural networks in the evaluation of debris flow had been shown to have feasibility of a certain degree.The problem lies in the selection of evaluation factors and determining of the weights,the research of two aspects is currently mainly based on experience,subjective and arbitrary is large.This paper constructd debris flow risk assessment model using feature selection based on rough sets, it is a good solution to this problem.

Debris flow hazards

Debris flow is one of the most harmful of the mountain hazards, it often caused heavy casualties and property losses and caused great harm to the state of regional development and public safety, it is a serious impediment to social and economic development in mountain areas. According to Ministry statistics, the average annual mountain hazards such as landslides caused about 1,000 deaths and direct economic losses is about 50 to 100 billion yuan.Debris often have outbreaks of a sudden, ferocious and swift characteristics. And have the dual role of both collapses, landslides and flood damage, the harm is greater than a single collapse, landslide and flood.The hazards are more widespread and severe.Therefore, risk assessment of debris flow is imminent.

The basic concept of rough set
The domain and dependence properties

With decision-making system $S = (U, C \cup D, V, f)$, C,D denote condition attributes and decision attribute respectively,positive region of the decision attribute under the condition attribute can be defined as $POS_C(D) = \bigcup_{X \in U/D} \underline{C}(X)$, POSC(D) denoted the division according to C is knowledge U/C,can be classified exactly U/D.