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Research on The Method of Comprehensive Zoning Indices Analysis in Natural Zoning for Highways

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Keywords: Natural Zoning for Highways, fuzzy clustering, rough set, comprehensive index analysis, influence coefficient

Abstract: Natural Zoning for Highways is the important basis of highway network planning and establishment of related specifications and standards. Determination method for influence coefficients of comprehensive zoning indices analysis model is the key to increase quantization degree of comprehensive zoning indices analysis. Based on the theories of fuzzy clustering and rough set, this paper put forward the method to reasonably determine the influence coefficients of single elements and calibrate the analysis model of comprehensive zoning indices through analyzing the calculation elements data by random sampling method. Highway surface configuration index(HSCI) was analyzed with this method. The map of HSCI reflects the influence degree of surface configuration on highway engineering in different regions in China correctly. Analysis result shows that the method improves the quantization degree of comprehensive zoning indices analysis.

Introduction

Natural Zoning for Highways is the important basis of highway network planning and establishment of related specifications and standards^[1]. Determination method for influence coefficients of comprehensive zoning indices analysis model is the key to increase quantization degree of comprehensive zoning indices analysis. Determination of influence coefficients is an important decision problem in the analysis and calculation course of comprehensive zoning indices because it reflect the position and function of every single element in the indices analysis model and effect the objectivity and accuracy of analysis results.

In previous study on Natural Zoning for Highways in China, zoning indices were not comprehensive ones, but usually single physical geographical element. For instance, China Natural Zoning for Highways in the year of 1986 took the temperature contours (-2°C contour line of annual mean temperature and 0°C contour line of January mean temperature) and the contour lines which divide China terrain into 3 steps(1000m and 3000m contour line) as the mark to divide China into 7 first-grade regions, and use moist coefficient as the mark to divide the second-grade regions on the base of first-grade ones. In 2000, comprehensive zoning indices were used in Natural Zoning for Highways of Gansu and Xinjiang province, and influence coefficients of elements were determined by expert estimation method^[2]. However, this method often leads to subjective and empirical results.

This paper put forward the determination method for influence coefficients of comprehensive zoning indices which is able to make full use of basic data of the elements to calculate the comprehensive zoning indices without subjective factor influence.

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