SLOPE ANALYSIS OF FUZZY SURFACE

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Abstract

Analysis of the slope is one of the fundamental analysis within geoinformatics, especially initial calculation. Slope analysis is usually used as the first step in much more sophisticated analysis as well as in complex models of natural phenomena. Fuzzy surface provides representation of geographical phenomena with all aspects of the uncertainty (either as description of the reality or uncertainty of measurement). The uncertainty in the input surface is crucial for analysis of slope. High level of uncertainty can significantly affect the result of slope analysis.

The Neighbourhood method was utilized to calculate with fuzzy numbers. This method is further used for the purpose of slope analysis of the fuzzy surface. The main reason for choosing this method is that this method belongs to the most common tools in GIS software (e.g. both ArcGIS and GRASS). The computation with fuzzy numbers instead of crisp numbers allows evaluation of uncertainty of the result slope. The aim of this paper is to present the process of slope calculation with fuzzy numbers as well as all necessary algorithms that are needed for such calculation.

The further analysis of uncertainty provides important information for the process of decision making. The level of uncertainty in the results of above mentioned analysis can be as important as the actual result. Especially it is essential in situations when the amount of uncertainty varies at higher values.

Keywords: slope analysis, fuzzy set, uncertainty

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