THE ROLE OF MAP ALGEBRA IN SPATIAL INFORMATION ANALYSIS

Akli Fundo[1], Shkëlqim Kuka[2]

[1]Faculty of Mathematic Engineering and Physic Engineering, Tirana Polytechnic University, Tirana, Albania, Email: aklifundo@yahoo.com
[2]Faculty of Mathematic Engineering and Physic Engineering, Tirana Polytechnic University, Tirana, Albania, Email: sh.kuka@fimif.edu.al, sh.kuka@gmail.com

Abstract

The mathematical knowledge needed when they have to deal with spatial information systems. In this framework also the role of algebraic structures is of a big importance. Perhaps the most usable of algebraic structures at Geographic Informations Systems (GIS) is Map Algebra.When working with maps or spatial data it is the case that different map features are stored in multiple layers, each layer containing a separate "theme". We often want to combine themes in such a way that information from both themes is preserved, or combined. Raster data is very different than vector data in this respect and you need to treat them differently. Map Algebra is a high-level computational language used for performing cartographic spatial analysis using raster data. Simply put, Map Algebra is math applied to rasters, a practice that's possible because rasters are geographically referenced arrays of numbers. Raster files consist of a grid of cells, each cell contains a numeric value. Many scientific and environmental datasets come as gridded rasters. Like all languages, Map Algebra is defined by rules. In a map algebra expression, the operators are a combination of mathematical, logical, or Boolean operators (+, >, AND, tan, and so on), and spatial analysis functions (slope, shortest path, spline, and so on), and the operands are spatial data and numbers. Functions are the major element of the Map Algebra language, and there are over a hundred of them. With Map Algebra, not only can you access functions not available in the user interface, you can also build complex expressions and process them as a single command. Map Algebra is being implemented at data sets that we referred to like: coverage, shapefiles, grid or layers. In this paper there are implemented the tools of map algebra (with software ArcGis versus software Qgis) into a proper given project.

Keywords**:** *Gis, Map Algebra, Raster, Boolean operators, shape files*