SCIENTIFIC APPROACH IN THE LINGUISTICS VARIABLES DETERMINATION OF FUZZY LOGIC SYSTEM TO PROJECTION SYSTEMS

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The confection of a map demands, first of all, the establishment of a method, according to which, to each point of the Earth, corresponds a point of the map and the other way around. Several methods can be used to get this correspondence of points, constituting the "Projection Systems". Each Projection System has its own equations, in order to guarantee that each point in the real surface has an only correspondent in the plan, being reciprocal the true one, characterizing a bijective function. It is impossible to proceed the transformation of the real surface in the plan, without any deformation and alteration of real the geometric characteristics of the Earth. Therefore, the choice of the projection system in representing a region of the Earth surface is something of extreme importance and it will depend on the objective of the final user. In this work, it will be presented an approach multi-criterion in questions linguistic variables of a Nebulous Inference System supporting the selection of cartographic projection for the representation of a region of Earth's surface, using a computational tool for decision support, which will provide a perfect evaluation of decision-making, regarding the choice of linguistic variables that can influence the choice of a projection system. Multi-criterion approach provides ways to model the decision-making processes, which come into consideration: a decision which has been taken, entirely unknown events that may affect the results, the possible courses of action and results. These models reflect, in a sufficiently stable way, the judgment of values of decision makers. One of the main methods of decision analysis multi criterion is the AHP – Analytic Hierarchy Process. It has been developed by Thomas L. Saaty in the mid-1970s in order to promote the elimination of cognitive limitations of decision makers. It is applied to systematize a wide range of problems in contexts economic, political, social and environmental, due to its simplicity, ruggedness and ability to evaluate qualitative and quantitative factors whether tangible or intangible. There are some programs on the market, as AUTOMAN, Expert Choice, HIPRE3 +, NCIC and that implement the AHP. Among them, the most used is the Expert Choice, however the commercial license price is high. Another option to implement the use of AHP is software Criterium. This software is a versatile computational tool that helps users to make complex decisions between alternatives involving multiple criteria. It should be noted that this software has a free version, restricted to academic use. For this reason, its use is to perform a case study of factors (variables) that may influence the choice of suitable projection system. In this work, it had been demonstrated the viability of the use of a computational tool to support the decision in the linguistics variables determination of a Fuzzy Logic System to select the best projection system for the representation of a terrestrial surface region.