M-APPROXIMATIVE SYSTEMS: A UNIFIED APPROACH TO FUZZY SETS, FUZZY TOPOLOGY AND ROUGH SETS[1]

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In the second half of the previous century there were introduced some new mathematical concepts whose aim was to adjust strict mathematical tools for the study of problems of applied nature. Probably the most important examples of such concepts are fuzzy sets [1], and rough sets [2]. Soon the interest of mathematicians turned also to abstract mathematical structures, topological and algebraic to be mentioned as the first ones, on the basis of fuzzy sets and rough sets. Although the origins of the constructions based on fuzzy sets and and on rough sets and the corresponding theories are essentially different, there were several attempts to develop a unified view on such structures, see e.g. [3]. An alternative unified viewpoint on fuzzy and rough sets based mathematical structures was presented in our talk at the conference "Fuzzy Sets: Theory ans Applications", (Liptovsky Jan, Slovakia, 2008 February). Further the corresponding theory was developed in [4]. The central concept for this approach is an M-approximative system which is actually a quadruple (L, M, u, l) where L is a complete lattice, M is a completely distributive lattice and $u, l : L \times M \to L$ are mappings satisfying axioms which are in a certain sense analogous to the axioms of a closure and of an interior operators respectively.

In this talk we shall discuss some properties of M-approximative systems and illustrate them by several examples.

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