REVIEW HABILITATION THESIS RNDr. Ondrej Krídlo, PhD.

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The habilitation thesis contains 5 excellent papers on formal concept analysis (FCA) and its categorial point of view. FCA is an important research area in mathematics and computer science focused on extracting information from relational datasets. Many relevant researchers have worked and are working in this area from different regions, such as Germany, France, Italy, Czech Republic, Russia, Spain, and also Slovakia, among others. Mr. Ondrej Krídlo has a great CV and has published recognized papers in this area, such as the considered in this habilitation thesis, which have been included in relevant ISI journals.

The first paper studies a very interesting notions in FCA, L-Chu correspondence. This notion provides a formal relationship among different relational datasets. The consideration of a fuzzy framework allows the use of these correspondences on datasets with uncertainty and/or imprecise data. The most important results of this paper are the relationship with L-bonds and that the L-Chu correspondences between two contexts form a complete lattice.

The second contribution continues with the study of L-Chu correspondences between L-contexts, defining L-ChuCors and proving that they form a category. This is one of the main results included in this paper. Moreover, it shows that L-ChuCors embeds the category of Boolean Chu correspondences and that it is a *-autonomous category, among other results.

The third paper is focused on the study of a category richer than the category associated with supremum preserving mappings between complete lattices (Slat). The paper shows that such category is the one associated with the completely lattice L-ordered sets (L-CLOS), in which L-equalities are considered. The most important contribution of this paper is the proof of the categorical equivalence between L-ChuCors and L-CLOS.

The fourth paper introduces formal concept analysis of higher order. This is a new and remarkable point of view in FCA, which has attracted the attention of the science community in this area. It can extract relations among object and attributes considering two levels on these sets, proving that the new operators form a L-fuzzy Galois connection. It is also interesting the relationship with heterogeneous formal contexts and standard homogenic fuzzy operators.

The last introduced paper closes a very interesting research line, which will have future amazing extensions. It studies the categorical product and the tensor product in the category ChuCors of formal contexts and Chu correspondences. As a consequence, the second-order FCA can be represented in terms of the arrows of the category generated by the Chu construction on the symmetric monoidal closed category ChuCors and a particular dualized object. In addition, this mechanism can be exported to study other FCA generalizations, which opens a promising future work.

Thus, due to the relevant contributions given by RNDr. Ondrej Krídlo, PhD., I strongly recommend the title of Associate Professor in the branch of "Informatics", as well as the extension of this great work and its application to real datasets.

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