

Covering-based Granular Computing

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Abstract—Covering is a 'charming' object in mathematics. It can be traditionally researched from different perspectives such as General Topology, Graph Theory and *et. al.*. With the step-by-step research on Rough Sets, the covering is talked again as a generation of 'partition'. In covering-generalized rough sets, the covering obtains a lot of study in its topological structure, approximation in a covering space, and its reduction. All those study are based on either the element of the covering (a subset of universe) or the intersection of the elements of the covering (a neighborhood of a point in the universe) as the knowledge, which could be either bigger or smaller. In this lecture, the covering can be generalized again from the framework of Granular Computing Theory. It will show up in its general form—the partial covering. First, it can be concentrated in the difference from covering-generalized rough sets, which the partial covering employs the pre-topology neighborhood and the neighborhood system. Secondly, the bright spot of the partial covering lies in its central knowledge which can approximate an arbitrary subset in the universe. Thirdly, in order to mine the central knowledge in the partial covering, its granular structure should be studied. Finally, a simple picture of application of the covering-based granular computing will be drawn to illustrate how to use it to model the reality.