

## Formulating Rough Approximations in Information Tables with Possibilistic Information

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**Abstract :** A rough set, which consists of lower and upper approximations, is formulated in information tables containing possibilistic information. First, lower and upper approximations on the basis of possible world semantics in the same way as Lipski did in the field of incomplete databases are shown in order to clarify fundamentals of rough sets under possibilistic information. Possibility and necessity measures are used, as is done in possibilistic databases. As a result, each object has certain and possible membership degrees to lower and upper approximations, which degrees are the lower and upper bounds. Therefore, the degree that the object belongs to lower and upper approximations is expressed by an interval value. And the complementary property linked with the lower and upper approximations holds, as is valid under complete information. Second, the approach based on indiscernibility relations, which is proposed by Dubois and Prade, are extended in three cases. The first case is that objects used to approximate a set of objects are characterized by possibilistic information. The second case is that objects used to approximate a set of objects with possibilistic information are characterized by complete information. The third case is that objects that are characterized by possibilistic information approximate a set of objects with possibilistic information. The extended approach create the same results as the approach based on possible world semantics. This justifies our extension.

**Keywords :** rough sets, possibilistic information, possible world semantics, indiscernibility relations, lower approximations, upper approximations

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