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## Latticized optimization problem on the Lukasiewicz fuzzy relational equations

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### **Abstract**

In this paper, we introduce a type of latticized optimization problem whose objective function is the maximum component function and the feasible region is defined as a system of fuzzy relational equalities (FRE) defined by the Lukasiewicz t-norm. Some necessary and sufficient conditions are derived to determine the feasibility of the problem. The feasible solution set is characterized in terms of a finite number of closed convex cells. Since the feasible solutions set of FRIs is non-convex, conventional methods may not be directly employed. An algorithm is presented for solving this nonlinear problem. It is proved that the algorithm can find the exact optimal solution and an example is presented to illustrate the proposed algorithm.

**Keywords:** Fuzzy relational equations, nonlinear optimization, Lukasiewicz t-norm, latticized programming.