

鹿児島大学数理情報科学談話会

第237回

日時：2019年11月6日（水）17:00 – 18:00

場所：理学部2号館404室

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題目：Algebras for Minimum Spanning Tree Problems

Abstract: Relation-algebraic methods have been used to develop algorithms for unweighted graphs. This works well because unweighted graphs can be directly represented as relations. We study a generalisation of relation algebras in which the underlying Boolean algebra structure is replaced with a Stone algebra. The generalised algebras model weighted graphs, which do not have direct representations as binary relations. Using the new algebras we prove the correctness of Prim's and Kruskal's minimum spanning tree algorithms. We show that these algorithms solve various optimisation problems with different aggregation functions, not just the original problem they were designed for. The proofs are formally verified in Isabelle/HOL, including the overall Hoare-logic argument, algebraic theories, calculations and models.

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