Weakly linear equations and inequalities for matrices over an additively idempotent semiring and applications

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Quantales, complete residuated lattices, complete Heiting algebras, and related residuated algebraic structures, represent an excellent basis for studying systems of fuzzy equations and inequalities. In contrast, semirings generally are not residuated structures, but for matrices over an additively idempotent semiring there is a kind of relative residuation which allows us to define and study Boolean residuals of matrices. These residuals will be used to solve weakly linear systems of matrix equations and inequalities. Iterative algorithms for testing the existence and computing the greatest solutions of these systems will be described. Bearing in mind that the behavior of timed automata is described using matrices over an additivly idempotent semiring, the previous methodology will be applied for testing behavioral equivalence between these automata.

The talk reports a joint work with M. Ćirić and J. Ignjatović.

References

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