

Semirings, Dioids and their links to Fuzzy Sets and other Applications

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Abstract

Algebraic structures such as Bottleneck Algebras (R, Max, Min) , Fuzzy Algebras $((0, 1), Max, Min)$ or more generally $((0, 1), Max, T)$ where T is a t -norm have been extensively used as relevant tools for modeling and solving problems related to Fuzzy Sets, Fuzzy relations and systems. Many of these algebraic structures may be viewed as special instances of canonically ordered Semirings, (i.e. semirings in which the preorder relation induced by addition is an order), these being frequently referred to as Dioids.

Though Semirings or Dioids do not enjoy all the classical properties of rings or fields in ordinary algebra, many classical results can be shown to be still valid in those structures. The talk will provide an overview of some of the most important properties of Semirings and Dioids in particular those related to solving linear systems, computing eigenvalues and eigenvectors, testing linear dependence or independence. Special emphasis will be put on the subclasses of Dioids more closely related to Fuzzy Set theory and applications.