Baczynski / Jayaram

Fuzzy Implications

Nothing new had been done in Logic since Aristotle! –KurtGodel ¨ (1906-1978) Fuzzyimplicationsareoneof themain operationsinfuzzy logic.Theygeneralize the classical implication, which takes values in {0,1}, to fuzzy logic, where the truth values belong to the unit interval [0,1]. In classical logic the implication canbede?nedindi? erentways.Threeofthesehavecometo assumegreatert- oreticalimportance,viz. the usual materialimplication from the Kleene algebra, the implication obtained as the residuum of the conjunction in Heyting algebra (also called pseudo-Boolean algebra) in the intuitionistic logic framework and the implication (also called as 'Sasaki arrow') in the setting of quantum logic. Interestingly, despite their di?ering de?nitions, their truth tables are identical in classical case. However, the natural generalizations of the above de? nitions in the fuzzy logic framework are not identical. This diversity is more a boon than a bane and has led to some intensive research on fuzzy implications for close to three decades. It will be our endeavor to cover the various works churned out in this period to su?cient depth and allowable breadth in this treatise. In the forewordto Klir andYuan's book[147],ProfessorLot?A. Zadehstates the following: "The problem is that the term 'fuzzy logic' has two di?erent meanings.

First book in the fertile area of fuzzy implication operators Includes supplementary material: sn.pub/extras



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