ASSOCIATIVE AND NON-ASSOCIATIVE SEMIRINGS USING BOOLEAN ALGEBRAS

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In this paper we give the construction of both associative and nonassociative semirings using Boolean Algebras. We say \((S, +, o)\) is an associative semiring if \((S,+)\) is a commutative monoid and \((S, o)\) is a semigroup with \(a \circ (b + c) = a \circ b + a \circ c\) and \((a + c) \circ b = a \circ b + c \circ b\) for all \(a, b, c \in S\). We say \((S, +, o)\) is a nonassociative semiring if \((S, o)\) is a nonassociative semigroup i.e., a groupoid. For a finite group \(G\) (or semigroup \(P\)) and for any Boolean algebra \(B\) we define the group Boolean algebra (semigroup Boolean algebra) analogous to group algebra (semigroup algebra) which is easily verified to be an associative semiring. If we replace the group by loop or the semigroup with identity by a groupoid with identity we get a nonassociative semiring. Here we study the properties of these semirings. Further this method gives us a mode of construction of semirings of any desired even order.