DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
UNIVERSITY OF SOUTHERN DENMARK, ODENSE

Mathematics seminar

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How rigid is the distributive law

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Abstract

Recently, the notion of a brace was introduced by Rump in the context of solving set-theoretic Yang-Baxter equation. In a formulation of Cedo, Jespers and Okninski, a (left) brace consists of a set A with two binary operations $\circ$ and $+$, such that $(A, +)$ is an abelian group, $(A, \circ)$ is a group, and operations are connected by the following brace distributive law: (1) $a \circ (b + c) = a \circ b + a \circ c - a$. In this talk we probe a possibility of modifying the brace distributive law in a way that connects it with the usual distributive law for rings. Thus we study a set A with two operations connected by (2) $a \circ (b + c) = a \circ b + a \circ c - \sigma(a)$, where σ is any function $A \to A$. We study the restrictions that need to be put on binary operations and on σ, and show that the both brace and (usual) ring distributive laws are characterised by a particular robustness. We place this discussion in a more general context of skew braces introduced by Guarnieri and Vendramin and skew or nearrings, and show that the ad-hoc modification of the distributive law such as in (2) has in fact a very natural (and quite far from the adhoc feel) formulation.