IDEMPOTENT LATIN SOLUTIONS OF THE YANG-BAXTER EQUATION AND TWISTED WARD QUASIGROUPS

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Idempotent left nondegenerate solutions of the Yang-Baxter equation are in one-to-one correspondence with twisted Ward left quasigroups, which are left quasigroups satisfying the identity $(x * y) * (x * z) = (y * y) * (y * z)$. Idempotent latin solutions of the Yang-Baxter equation are in one-to-one correspondence with twisted Ward quasigroups. Every twisted Ward quasigroup $(X, *)$ is of the form $x * y = c\psi(x^{-1}y)$ for some group $(X, \cdot)$, an automorphism ψ of $(X, \cdot)$ and $c \in X$; up to isomorphism, it suffices to consider $c = 1$ and ψ up to conjugation in the automorphism group of $(X, \cdot)$. The Cayley kernel of a twisted Ward left quasigroup is not necessarily a congruence but its blocks have the same size. A twisted Ward left quasigroup of prime order is either permutational or a quasigroup.