Semilattices of Groups in a Given Variety and Rectangular Bands

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In a recent scientific paper, Monzo characterized semilattices of rectangular bands and groups of exponent 2 as the semigroups that satisfy the following conditions: x = x^3 and xyx \in {xy^{2}x, y^{2}x^{2}y}. In a subsequent paper, these semigroups were characterized by the following conditions: x = x^3 and xy \in {(xy)^{2}, yx}. This characterization contains band's idempotency (xy=(xy)^2) and the commutativity of groups of exponent 2 (xy=yx), and hence is much more natural. But the key feature of this characterization is that it prompts the conjecture that semilattices of rectangular bands and groups satisfying the identity xy=v might be characterized by xy in {(xy)^2, v}. The aim of this research was to prove this conjecture in fact holds for the special case of words v in which x and y appear the same number of times, the first letter is y and the last is x. As a very particular case of this general theorem we get the result that semilattices of rectangular bands and commutative groups are characterized by xy in {(xy)^2, yx}.

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