1064-17-403 **Tomasz Kowalski*** (kowatomasz@gmail.com), Av. Professof Gama Pinto 2, Lisbon, Portugal.
Independent varieties of loops.

We characterise joins of disjoint varieties $\mathcal{V}_1$, $\mathcal{V}_2$ of loops. The problem amounts to characterising independent varieties of loops. We obtain:

Theorem 1 *$\mathcal{V}_1$ and $\mathcal{V}_2$ are independent if and only if there exist unary terms $s(x)$ and $s'(x)$, satisfying*

1. $\mathcal{V}_1 \models s(x) = x,\ s'(x) = s'(y) = e,$
2. $\mathcal{V}_2 \models s(x) = s(y) = e,\ s'(x) = x.$

For varieties of power-associative loops with inverse property we can do better:

Theorem 2 *$\mathcal{V}_1$ and $\mathcal{V}_2$ are independent if and only if there is an integer ℓ such that $\mathcal{V}_1 \models x^\ell = e$ and $\mathcal{V}_2 \models x^{\ell-1} = e$. Moreover, if both $\mathcal{V}_1$ and $\mathcal{V}_2$ are nontrivial, then $\ell > 2$.*

Theorem 3 *The following are equivalent.*

1. *$\mathcal{V}$ satisfies the identities $x^{k(k-1)} = e$ and $(xy)^{1-k}(zu)^k = x^{1-k}z^k y^{1-k}u^k$ for some $k > 2$.*
2. *$\mathcal{V} = \mathcal{V}_1 \times \mathcal{V}_2$, for nontrivial independent varieties $\mathcal{V}_1$ and $\mathcal{V}_2$.*

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