YANG-BAXTER QUASIGROUPS

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A quasigroup Q with multiplication $\cdot$ and division operations $\backslash, /$ is said to be a *Yang-Baxter quasigroup* if there exists a binary operation $\circ : Q \times Q \to Q$ such that the mapping $Q \times Q \to Q \times Q; (x, y) \mapsto (x\backslash y, x \circ y)$ is a set-theoretic solution of the Yang-Baxter equation. The operation $\circ$ is then uniquely determined and in fact, must be $x \circ y = y/((x\backslash y)(x\backslash(y\backslash y)))$. Yang-Baxter quasigroups include other well-known classes of solutions, such as groups (in which case $\backslash$ is associative and $x \circ y = e$, the identity element), latin quandles (in which case $\backslash$ is left self-distributive and $x \circ y = x$) and latin rumples (a.k.a. "cycle sets", corresponding to involutive solutions).

The main result of this talk is that the variety of Yang-Baxter quasigroups is axiomatized by two very elegant identities which make it transparent that they include latin quandles and latin rumples as special cases. I'll also discuss some (very!) low order enumeration and other miscellaneous results.

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