

1083-55-75

Jozef H. Przytycki* (przytyck@gwu.edu), Department of Mathematics, George Washington University, Washington, DC 20052. *Extending an entropic magma by an affine entropic magma.*

It is a classical result in group theory that extensions of a group G by an abelian group A , with the given action of G on A are classified by $H^2(G, A)$. The analogous result for racks and quandles was obtained by Carter-Elhamdadi-Kamada-Saito. Here we consider the case of entropic magma $(X; *)$ (that is $(a * b) * (c * d) = (a * c) * (b * d)$). To build an entropic operation on $A \times X$ we assume that A is an affine entropic magma, that is A is an abelian group with two commuting automorphisms, t, s (equivalently, A is a $Z[t^{\pm 1}, s^{\pm 1}]$ -module) and the operation is given by $a_1 * a_2 = ta_1 + sa_2 + a_0$. The action on $A \times X$ is given by $(a_1, x_1) * (a_2, x_2) = (a_1 * a_2 + f(x_1, x_2), x_1 * x_2)$. We show that the action is entropic if $tf(x_1, x_2) - tf(x_1, x_3) + sf(x_3, x_4) - sf(x_2, x_4) + f(x_1 * x_2, x_3 * x_4) - f(x_1 * x_3, x_2 * x_4) = 0$ (2-cocycle condition). Two operations on $A \times X$ yielded by f_1 and f_2 are (fiber preserving) equivalent if $f_1 - f_2 = \partial c$ where $c : X \rightarrow A$ and $(\partial c)(x_1, x_2) = tc(x_1) + sc(x_2) - c(x_1 * x_2)$. This is the starting point of our work with Maciej Niebrzydowski where we construct homology theory for entropic magmas and look for generalization of Conway algebra invariants of links developed by Przytycki-Traczyk. (Received August 17, 2012)