

**AAA88 – 88th Workshop on General Algebra**

June 19–22, 2014

**Warsaw University of Technology, Stefan Banach International  
Mathematical Center, Warsaw Center of Mathematics and Com-  
puter Science**

Warsaw, Poland

**Associativity, preassociativity, and string functions**

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In the theory of  $n$ -ary semigroups, the classical concept of associativity is generalized for  $n$ -ary operations. This concept has been further generalized for string-defined operations, i.e., functions  $f: X^* \rightarrow X$ , where  $X^*$  denotes the set of strings over an alphabet  $X$ . Marichal and Teheux recently introduced the concept of pre-associativity, which generalizes associativity in a slightly different manner that does not involve any composition of functions.

We introduce the concept of associativity for string functions, i.e., unary operations on  $X^*$ . We discuss this new property and describe certain classes of associative string functions. Furthermore, we characterize preassociative functions as compositions of associative string functions with injective unary maps. Finally, we provide descriptions of associative and preassociative functions which depend only on input length.