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Masahico Saito, Department of Mathematics, University of South Florida, Tampa, FL 33620, and **Emanuele Zappala***, Institute of Mathematics and Statistics, University of Tartu, 51009 Tartu, Estonia. *Fundamental heaps and cocycle invariants for compact orientable surfaces with boundary.*

Ternary self-distributive (TSD) structures are generalizations of well known algebraic structures called shelves, of which racks and quandles represent particular subclasses. Heaps are an important family of examples of TSD operations that are known not to be reducible to compositions of binary shelves. In this presentation I will describe how to utilize heaps and their TSD cohomology theory to obtain invariants of compact orientable surfaces with boundary embedded in 3-space. The main ingredients of these constructions are ternary versions of the known methods of fundamental quandles and cocycle invariants for links and knotted surfaces. I will present, moreover, some results concerning these invariants, such as the behavior of the invariants under addition/deletion of twisted bands, the realization problem for finitely presented heaps as fundamental heaps of some compact orientable surface with boundary, and the existence of non-split surfaces with nontrivial cocycle invariant for any fixed pair of genus and boundary components. (Received September 14, 2021)