1145-55-141 **Steve Huntsman*** (steve.huntsman@baesystems.com) and **Michael Robinson** (michaelr@american.edu). *Topology of basic blocks.* Preliminary report.

Dowker's theorem gives a homotopy equivalence between the two natural simplicial complexes formed from a relation between two finite sets. The topology of these complexes encodes information about the underlying relation. In the special case of homology with $\mathbb{F}_2$ coefficients, the complexes do not even need to be explicitly constructed. These observations have by now a long tradition of applications spanning Q-analysis (from the 1970s!), topological navigation and mapping, and computing lower bounds in privacy analyses. In many cases of potential interest, one or both sets underlying a relation to be analyzed is a topological space in its own right, and this leads to a cosheaf structure and attendant notion of local homology, which to our knowledge has not yet been applied. Here, we sketch the application of these ideas to the analysis of basic blocks, i.e., computer programs without control flow. In particular, using the example of matrix multiplication, we give evidence that topological invariants can capture salient information about algorithms, versus merely about functions or programs. (Received August 08, 2018)