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Stephen E. Rodabaugh* (serodabaugh@ysu.edu), Institute for Appl. Top. and Top. Structures, College of Science, Tech., Eng., Mathematics, Youngstown State University, Youngstown, OH 44406-1001. *Programming Semantics to Lattice-Valued Topology via Topological Systems*.

E. W. Dijkstra (1976) improved programs by focusing on outputs and predicates, postulating that deterministic programs comprise a “forward” input-to-output mapping and a “backward” mapping to pull output predicates back to input predicates. In 1983, M. Smyth advocated viewing predicates as open sets, with morphisms acting continuously between input and output “systems”.

Unrelated were notions of L. A. Zadeh (1965), J. A. Goguen (1967, 1973), and C. L. Chang (1968) leading to S. E. Rodabaugh’s (1981) schema of categories for “lattice-valued” topology, including **Loc-Top** comprising spaces (X, L, τ) —“carrier” set X , frame L of membership values, and subframe $\tau \subset L^X$ —with “continuous” morphisms (f, φ) , f a “forward” mapping between carrier sets and φ^{op} a “backward” mapping between frames of membership values.

Finally, S. J. Vickers (1989) proposed category **TopSys** comprising “topological systems”—a set, a locale of predicates, and a satisfaction relation reflecting the predicate frame structure into the powerset of the set—together with Dijkstra’s programs as morphisms.

This talk links Dijkstra’s ideas to lattice-valued topologies via topological systems. (Received September 03, 2012)