

1134-18-32

David I. Spivak* (dspivak@mit.edu). *A higher-order temporal logic for dynamical systems.*

We consider a very general class of dynamical systems—including discrete, continuous, hybrid, deterministic, non-deterministic, etc.—based on sheaves. We call these sheaves *behavior types*: they tell us the set of possible behaviors over any interval of time. A machine can be construed as a wide span of such sheaves, and these machines can be composed as morphisms in a hypergraph category. The topos of sheaves has an internal language, which we use as a new sort of higher-order internal logic for talking about behaviors. We can use this logic to prove properties about a composite system of systems from properties of the parts and how they are wired together. (Received June 28, 2017)