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Daniel Michael Cicala* (cicala.daniel@gmail.com), 400 S Main St, Unit 306, Los Angeles, CA 90013. *Syntax and inductive rewriting for open networks.*

Networks exist across disciplines and so have developed idiosyncrasies local to the various fields in which it is used. A recent research program aims to use category theory to abstract away idiosyncrasies, centralize compositionality, and develop a common language. In this talk, we introduce a syntax for open networks we call structured cospans. Starting with a functor $L: \mathbf{A} \rightarrow \mathbf{X}$ from a category \mathbf{A} of “interface types” to a category \mathbf{X} of “networks”, a structured cospan is a pair of morphisms of type $La \rightarrow x \leftarrow Lb$ in \mathbf{X} . Here x represents a network and La, Lb give x inputs and outputs, respectively. Using pushouts, we can connect two structured cospans when the input of one coincides with the outputs of the other. This models connecting compatible open networks to form a larger open network. Making several mild assumptions about $L, \mathbf{A}, \mathbf{X}$, we show that structured cospans admit a rewriting theory generalized from the double pushout style popular in graph theory. The main result is a categorical semantics that characterizes the rewriting of a network inductively, that is by rewriting sub-networks and connecting them together. (Received September 24, 2018)