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Neural Algebra and Modeling.

The mathematical model introduced in this paper attempts to explain how complex scripts of behavior and conceptual contents can reside in, combine and interact on large networks of interconnected basic actors.The approach derives from modeling the neural structure and dynamics of the connectome of a brain. The neurological hypothesis attributes functions of the brain to sets of firing neurons, dynamically as sets of cascades of such firings, typically visualized by imaging technologies. Such sets are represented as the elements of what we call a neural algebra, and their interaction as its basic operation. In particular we analyze the representation of perception and of control in its various forms, distributed, hierarchical, recursive and especially reflexive control, the latter modeling the concept of self-reflecting control. The main thrust of this paper develops from the fact that characteristic properties of these suggestive notions can be cast in the form of equations of the neural algebra. Analyzing the solutions leads to a complete description of the necessary structure of their neural correlates.