Contents

Preface / vii

From Wolves Hunting Elk to Rubik's Cubes: Are the Cortices Composition/Decomposition Engines? / 1 David Arathorn

When Compositionality Fails to Predict Systematicity / 6
Reinhard Blutner, Petra Hendriks, Helen de Hoop, and Oren Schwartz

Context-free versus Context-Dependent Constituency Relations: A False Dichotomy / 12

Francisco Calvo Garzón

Learning Context Sensitive Logical Inference in a Neurobiolobical Simulation / 17

Chris Eliasmith

Scaling Connectionist Compositional Representations / 20 John C. Flackett, John Tait, and Guy Littlefair

Cloning Composition and Logical Inferences in Neural Networks Using Variable-Free Logic / 25 Helmar Gust and Kai-Uwe Kühnberger

A Solution to the Binding Problem for Compositional Connectionism / 31 John E. Hummel, Keith J. Holyoak, Collin Green, Leonidas A. A. Doumas, Derek Devnich, Aniket Kittur, and Donald J. Kalar

Using Simple Recurrent Networks to Learn Fixed-Length Representations of Variable-Length Strings / 35

Christopher T. Kello, Daragh E. Sibley, and Andrew Colombi

Recurrent Representation Reinterpreted / 40

David Landy

Generating Semantic Graphs through Self-Organization / 44
Marshall R. Mayberry III and Matthew W. Crocker

On-Line Learning of Predictive Compositional Hierarchies by Hebbian Chunking / 50 Karl Pfleger

> Compositionality in a Knowledge-Based Constructive Learner / 54 François Rivest and Thomas R. Shultz

> > Where Does Compositionality Come From? / 59
> >
> > Mark Steedman

On the Relationship between Symbolic and Neural Computation / 63
Whitney Tabor and Dalia Terhesiu

On Early Stages of Learning in Connectionist Models with Feedback Connections / 69

Peter Tino and Barbara Hammer

A Neural Model of Compositional Sentence Structures / 72 Frank van der Velde

Implementing the (De-)Composition of Concepts:
Oscillatory Networks, Coherency Chains and Hierarchical Binding / 76
Markus Werning and Alexander Maye

Geometric Ordering of Concepts, Logical Disjunction, and Learning by Induction / 82 Dominic Widdows and Michael Higgins