# Inference and Execution of Semantic Structures

## General Form for the Rules of inference for a sequence of thoughts

Let us denote by a thought sequence composed of thoughts from a set of contexts on the same context path. Let us denote with the thoughts in . Let us denote by a set of -particles which are entirely contained in the thought sequence such that each of the thoughts in contains at least one -particle from . The set will be the *inference trigger* which if present will kick start the synthesis of a new sequence of thoughts which will be the result of the inference. The new ordered sequence of thoughts will be denoted with . The mapping from to will represent inference operation which will be triggered by the presence of .

Let us consider the following set of examples:

*Example 1a: I do not know John.*

*Example 1b: I probably do not know John. “Probably” means I am not certain.*

*Inference a: I am not certain that I do know John. -or-*

*b: I am not certain that I do not know John.*

*Example 1c: He probably does not know John. “Probably” means I am not certain.*

*Inference: a: He is not certain that he knows John. -or-*

*b: He is not certain that he does not know John*

## Types of Inference Processes

We recognize three types of inference processes – Inductive, Deductive and Abductive inference (Peirce, 1878).

### Inductive Inference

### Deductive Inference

### Abductive Inference

## Learning Model for Inference Processes

Hypothesis Synthesis of new thoughts Hypothesis

## Execution of thoughts

Phases of the execution of sequence of thoughts

1. Parses a sequence of new thoughts
2. Applies Inference which results into the generation of new sequence of thoughts

Execution of a thought sequence occurs when all of the following conditions are met:

1. has been inferred or parsed from a source

# Bibliography

Fischer, H. R. (2001). Abductive Reasoning as a Way of Worldmaking. *Foundations of Science, special issue on "The Impact of Radical Constructivism on Science", edited by A. Riegler, 2001, vol. 6, no.4*, 361-383.

Peirce, C. S. (1878, August). Deduction, Induction, and Hypothesis. *Popular Science Monthly, Vol 12*, pp. 470-482.

Wang-Zhou Dai, Q. X.-H. (2019). Bridging Machine Learning and Logical Reasoning by Abductive Learning. *33rd Conference on Neural Information Processing Systems (NeurIPS 2019).* Vancouver, Canada.