# 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

Multi step process for building and refining a hypothesis

Hypothesis is synthesized and refined in a set of iterations. After it matches the input and output the hypothesis will be used for making an inference, ranked and stored for a future use.

## Learning Model for Inference Processes

Hypothesis Synthesis of new thoughts Hypothesis

## Execution of thoughts

### Generative-Adversarial model for thought execution

A new sequence of thoughts is formed by parsing of new thoughts and recursive application of inference to the pool of thoughts within the current context path. Simulated execution is performed resulting in the creation of Execution Plan. Alternative 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

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

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