# Thought Synthesis

## Thought and Particle Signatures

Let P be a thought particle. A thought particle can be an *object particle* denoted with V (corresponding to a vertex in the thought DAG) or a *connecting particle* denoted with A (corresponding to an arc in the thought DAG). The object particle is also known as *V-particle* and the connecting particle is known as *A-particle*.

When parsing a new thought we construct the thought path:

< V1 A1 V2 A3 V3 A4 … Ak-1 Vk >

In the association phase the thought path is augmented to a DAG which may look like:

< V1 A1 V2 A3 V3 A4 … Ak-1 Vk >

|\_\_\_\_Ak\_\_\_| |

|\_Ak+1\_Vother

Compound thought particle is a subset of a thought path starting with object particle Vstart followed by connecting particle A1, etc, and ending with object particle Vend. It is denoted by square brackets in which the sub-particles are enclosed:

[ Vstart A1 V1 … Vend ]

Thought radical is a piece of a thought which starts and/or ends with connecting particle. It is denoted by braces in which the sub-particles are enclosed:

{ Astart V1 … Aend }

Signature of a thought particle is a matrix S[i,j] where 0 < i < m, 0 < j < n

Rule for calculation of the thought signature of a compound thought particle

Vcomp = [ Vstart A1 V2 … Vend ]

Sig(Vstart) = Sstart[i,j]

Sig(A1) = S1[i,j]

Sig(V2) = S2[I,j]

Sig([Vstart A1 V2]) = Op^{A} (A1) (Sig(Vstart)) + Op\_{A}(A1) (Sig(V2)) which is also mxn matrix

Every connecting particle signature encodes the operation which will be applied to the object particle on the left Op^{A} and the operation which will be applied to the object article on the right Op\_{A}.

Obviously the signature of every compound thought particle is mxn matrix.