The Notion of Affinity in Semantic Structures

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Example:
Semantic structure S_1:
"I live in and my name is."
$ssig(S_1) = [\mathbf{V}_1\ \mathbf{A}_{1,2}\ \mathbf{V}_2\ \mathbf{A}_{1,3}\ \mathbf{V}_3\ \mathbf{A}_{1,4}\ \mathbf{V}_4\ \mathbf{A}_{4,5}\ \mathbf{V}_5\ \mathbf{A}_{5,6}\ \mathbf{V}_6\ \mathbf{A}_{6,7}\ \mathbf{V}_7]$
$text(V_1)$ = "live"
$text(V_S)$ = "a car"
$text(V_T)$ = "Sofia"
$text(V_P)$ = "Dimitar"
$text(V_Q)$ = "Poison"

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    V_1________
  /   \         \
V_2    V_3        V_4
        |        /
        *      V_5
             /  \
V_S   V_T    V_6   *
            /          V_P  V_Q
          V_7
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We have semantic particles which demonstrate affinity for specific properties. This means the particle attracts unconnected V-particles with specific combination of properties in their signature. It also demonstrates anti-affinity i.e. repels unconnected V-particles which have different combination of properties in their signature.

Affinity field of the semantic structure S – a discrete field which defines affinity / anti-affinity force $F(V_i)$ between the particle V_i of the semantic structure S and a test particle $V_{test}(P)$
$F(V_i, V_{test}) = F_i(P), i \in \mathbb{v}(S)$
$\mathbb{v}(S)$ denotes the set of indices of the V-particles in the semantic structure S
P is the properties tree $ptree(V_{test})$ of the test particle V_{test}. We will assume general form of P.

The affinity force $F_i(P)$ is a function that maps the property tree P to a signed real number. The function $F_i(P)$ identifies specific features of the property tree such as the presence of specific subtree $\mathfrak{T} \subset P$ or a specific set of properties $\mathcal{S} \subset P$ toward which V_i has strong affinity (attraction). Note that F_i has implicit dependence on S as well i.e. in a context different than S F_i could have different values for the same P.