Handout for the Workshop on Inference from Text

Fragments and boundaries.

FOL

FO\(^2\) + trans

Church-Turing

\(\mathcal{R}^\dagger\) (tr)

\(\mathcal{R}^\dagger\) (tr, opp)

\(\mathcal{R}^\dagger\)

\(\mathcal{R}^\dagger\) (tr)

\(\mathcal{R}^\dagger\) (tr, opp)

\(\mathcal{R}^\dagger\)

\(\mathcal{R}^\dagger\) (tr)

\(\mathcal{R}^\dagger\) (tr, opp)

first-order logic

\(\text{FO}^2 + "R\ \text{is trans}"\)

2 variable FO logic

\(\dagger\) adds full \(N\)-negation

\(\mathcal{R}^\dagger\) (tr) + opposites

\(\mathcal{R}^\dagger\) + (transitive)

comparative adjs

\(\mathcal{R} + \) relative clauses

\(S + \) negation on nouns

\(\mathcal{R} = \) relational syllogistic

\(S^\equiv\) adds \(|p| \geq |q|\)

\(S:\) all/some/no \(p\) are \(q\)

Notation for \(\mathcal{R}\), from Pratt-Hartmann and Moss (2009).

\(\forall(p, \exists(q, r))\) Every \(p\) rs some \(q\)

\(\exists(p, \exists(q, r))\) Some \(p\) rs some \(q\)

\(\forall(p, \forall(q, r))\) Every \(p\) rs every \(q\)

\(\exists(p, \forall(q, r))\) Some \(p\) rs every \(q\)

\(\forall(p, \forall(q, r))\) Every \(p\) rs every \(q\)

\(\exists(p, \forall(q, r))\) Some \(p\) rs no \(q\).

The valid argument below can be represented in the language \(\mathcal{R}\):

Every porter recognizes every porter
No quarterback recognizes any quarterback
No porter is a quarterback

The derivation in the logical system for \(\mathcal{R}\) is

\[
\begin{align*}
\forall(p, \forall(q, r)) & \quad \exists(p, \exists(q, r)) \\
\forall(q, \forall(q, r)) & \quad \exists(q, \exists(q, r)) \\
\forall(p, \exists(q, r)) & \quad \exists(p, \exists(q, r)) \\
\forall(p, \forall(q, r)) & \quad \exists(p, \forall(q, r)) \\
\forall(p, q) & \quad RAA \tag{\star}
\end{align*}
\]