Phil 478
Spring 2018

Brewka 1994 (with scenarios)

1. Let $\Delta = \langle W, \mathcal{D}, < \rangle$ be a fpdt, S a scenario based on this theory. Then the defaults from $\mathcal{D}$ that are *active* in context of S are those from:

$$Active_{W,\mathcal{D}}(S) = \{\delta \in \mathcal{D} : \delta \in Triggered_{W,\mathcal{D}}(S),\ \delta \notin Conflicted_{W,\mathcal{D}}(S),\ \delta \notin S\}$$

2. Where S is a set of defaults and $<$ is an ordering on S, then the *maximal defaults* fm S based on $<$ are those from the set

$$Maximal_{<}(S) = \{\delta \in S : \neg \exists \delta' \in S (\delta < \delta')\}$$

3. Fact: if $<$ is total, then $Maximal_{<}(S)$ contains at most one element.

(Def: $<$ is total iff

$$\forall \delta, \delta' \in S \ (\delta < \delta' \text{ or } \delta' < \delta)\ )$$

4. Let $\Delta = \langle W, \mathcal{D}, < \rangle$ be a fpdt where $<$ is total. The S is a <u>simple</u> <u>Brewka</u> <u>scenario</u> based on Δ iff

$$S = \bigcup S_i$$

where

$$S_0 = \emptyset$$

$$S_{i+1} = \begin{cases} S_i, \text{ if } \; Active_{W\mathcal{D}}(S_i) = \emptyset \\ \\ S_i \cup \{ Max_{<}(Active(S_i)) \}, \text{ else} \end{cases}$$

5. A total order $<'$ extends a partial order $<$ iff: $\forall \delta \delta' \, (\delta < \delta' \Rightarrow \delta <' \delta')$.

6. Let $\Delta = \langle W, \mathcal{D}, < \rangle$ be a fpdt. The S is a <u>Brewka</u> <u>scenario</u> based on Δ iff there is some default theory $\Delta' = \langle W, \mathcal{D}, <' \rangle$ where (a) $<'$ is a total order extending $<$, and S is a simple Brewka scenario based on Δ'.