CS 486: Spring 2001
Cornell University
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Feb 13 Lecture Notes: Finishing definition of a tableau

Smullyan p.24 translated into formalism

Tableaux$_X$ = $\{t : TTree \mid root(t) =< F, X >$ &
for all interior nodes of t
if α occurs on P_s then successor of s is α_1 or α_2
if β occurs on P_s then β_1, β_2 are successors of $s\}$

This defines a collection of analytic tableaux for X. Each element, t, is a particular tableau. We might denote it by t_x. Note, Smullyan writes P_y for P_s.

We added the definition of a labeled tableau.

Labeled Tableaux$_X$ = $\{t : LTTree \mid root(t) =< 1, F, X, 0 >$ &
for all interior nodes $s \in$ nodes$(t) =< n, \mathtt{s}, y, k >$, for some $m < n$.
if $t@m$ is an α on P_s then the successor of the node is $< n + 1, \alpha_1, m >$
if $t@m$ is a β on P_s then the successors of the node are
$< n + 1, \beta_1, m >, < n + 2, \beta_1, m >\}$

Let step be the systematic procedure defined in Smullyan p.18 and specified more precisely in class on Thurs, Feb 8.

step: $LTTree \rightarrow LTTree$
(Labeled Tableau Tree $\rightarrow$ Labeled Tableau Tree)

Recall the definition and theorem.

Def: step$(t_i) = t_{i+1}$ is a tableau development

Theorem: All systematic tableau developments starting from $t_0 =< 1, F, X, 0 >$ for any $X \in Form$ terminate (in at most $2^{|X|}$ steps).

Def: Let step*(t) be the final tableau in a systematic development.

Def: SystematicLabeledTableaux$_X$ == $\{t : LTTree \mid root(t) =< 1, F, X, 0 >$ & t =step*(t_0).$\}$

Note: A particular systematic tableau is uniquely determined by a sequence of numbers $l_0, l_1, \ldots, l_k$ that select the line used in the next step.