Inference at $*$ 1
of proof for Lemma adjacent-append:

1. T : Type
2. $x : T$
3. $y : T$
4. $L_1 : T$ List
5. $L_2 : T$ List
6. $i : \{0..(\|L_1 @ L_2\| - 1)^-\}$
7. $x = (L_1 @ L_2)[i]$
8. $y = (L_1 @ L_2)[(i+1)]$

$\vdash (\exists i{:}\{0..(\|L_1\| - 1)^-\}.\ (x = L_1[i]\ \&\ y = L_1[(i+1)]))$
$\quad \vee ((0 < \|L_1\|)\ \&\ (0 < \|L_2\|)\ \&\ x = \mathrm{last}(L_1)\ \&\ y = \mathrm{hd}(L_2))$
$\quad \vee (\exists i{:}\{0..(\|L_2\| - 1)^-\}.\ (x = L_2[i]\ \&\ y = L_2[(i+1)]))$
by ((Decide $i < \|L_1\|$)
CollapseTHENA (Auto·))·

1:

9. $i < \|L_1\|$

$\vdash (\exists i{:}\{0..(\|L_1\| - 1)^-\}.\ (x = L_1[i]\ \&\ y = L_1[(i+1)]))$
$\quad \vee ((0 < \|L_1\|)\ \&\ (0 < \|L_2\|)\ \&\ x = \mathrm{last}(L_1)\ \&\ y = \mathrm{hd}(L_2))$
$\quad \vee (\exists i{:}\{0..(\|L_2\| - 1)^-\}.\ (x = L_2[i]\ \&\ y = L_2[(i+1)]))$

2:

9. $\neg(i < \|L_1\|)$

$\vdash (\exists i{:}\{0..(\|L_1\| - 1)^-\}.\ (x = L_1[i]\ \&\ y = L_1[(i+1)]))$
$\quad \vee ((0 < \|L_1\|)\ \&\ (0 < \|L_2\|)\ \&\ x = \mathrm{last}(L_1)\ \&\ y = \mathrm{hd}(L_2))$
$\quad \vee (\exists i{:}\{0..(\|L_2\| - 1)^-\}.\ (x = L_2[i]\ \&\ y = L_2[(i+1)]))$

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