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

$\vdash \forall T$:Type, $x$, $y$:$T$, $L_1$, $L_2$:($T$ List).
adjacent($T$;$L_1$ @ $L_2$;$x$;$y$)
$\iff$ (adjacent($T$;$L_1$;$x$;$y$)
$\vee$ ((0 < $\|L_1\|$) & (0 < $\|L_2\|$) & $x$ = last($L_1$) & $y$ = hd($L_2$))
$\vee$ adjacent($T$;$L_2$;$x$;$y$))
by ((RepUR“adjacent“ 0)
CollapseTHEN (((MaAuto·)
CollapseTHEN (((ExRepD·)

CollapseTHEN (Auto’))·))·))·

1:

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

2:

1. $T$ : Type
2. $x$ : $T$
3. $y$ : $T$
4. $L_1$ : $T$ List
5. $L_2$ : $T$ List
6. ($\exists i$:{0..($\|L_1\|$ - 1)$^-$}. ($x$ = $L_1$[$i$] & $y$ = $L_1$[($i$+1)]))
   $\vee$ ((0 < $\|L_1\|$) & (0 < $\|L_2\|$) & $x$ = last($L_1$) & $y$ = hd($L_2$))
   $\vee$ ($\exists i$:{0..($\|L_2\|$ - 1)$^-$}. ($x$ = $L_2$[$i$] & $y$ = $L_2$[($i$+1)]))

$\vdash$ $\exists i$:{0..($\|L_1$ @ $L_2\|$ - 1)$^-$}. ($x$ = ($L_1$ @ $L_2$)[$i$] & $y$ = ($L_1$ @ $L_2$)[($i$+1)])

3:

1. $T$ : Type
2. $T$
3. $T$
4. $L_1$ : $T$ List
5. $L_2$ : $T$ List

6. $0 < \|L_1\|$
7. $0 < \|L_2\|$

$\vdash \neg(\uparrow \text{null}(L_1))$

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