```
no_repeats_cons  THM

⊢  ∀T:Type, l:T List, x:T.
|  no_repeats(T;[x / l]) ⟺ no_repeats(T;l) & ¬(x ∈ l)
| by Unfold ‘no_repeats‘ 0 THEN Reduce 0 THEN Auto’
|
|\
| 1. T : Type
| 2. l : T List
| 3. x : T
| 4. ∀i,j:ℕ.
| |  i<||l||+1 ⇒ j<||l||+1 ⇒ ¬i = j ⇒ ¬[x / l][i] = [x / l][j]
| 5. i : ℕ
| 6. j : ℕ
| 7. i<||l||
| 8. j<||l||
| 9. ¬i = j
| ⊢  ¬l[i] = l[j]  by AllHyps (InstHyp [i+1;j+1]) THENA  Auto’
| |
| 1. T : Type
| 2. l : T List
| 3. x : T
| 4. ∀i,j:ℕ.
|    i<||l||+1 ⇒ j<||l||+1 ⇒ ¬i = j ⇒ ¬[x / l][i] = [x / l][j]
| 5. i : ℕ
| 6. j : ℕ
| 7. i<||l||
| 8. j<||l||
| 9. ¬i = j
| 10. ¬[x / l][(i+1)] = [x / l][(j+1)]
| ⊢  ¬l[i] = l[j]
|   by ...
|
|\
| 1. T : Type
| 2. l : T List
| 3. x : T
| 4. ∀i,j:ℕ.
| |  i<||l||+1 ⇒ j<||l||+1 ⇒ ¬i = j ⇒ ¬[x / l][i] = [x / l][j]
| ⊢  ¬(x ∈ l)  by D 0 THENA Auto THEN D (-1) THEN ExRepD
| |
| 1. T : Type
| 2. l : T List
| 3. x : T
| 4. ∀i,j:ℕ.
| |  i<||l||+1 ⇒ j<||l||+1 ⇒ ¬i = j ⇒ ¬[x / l][i] = [x / l][j]
| 5. i : ℕ
| 6. i<||l||
| 7. x = l[i]
| ⊢  False  by AllHyps (InstHyp [0;i+1]) THENA Auto’
| |
| 1. T : Type
| 2. l : T List
| 3. x : T
| 4. ∀i,j:ℕ.
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|    i<||l||+1 ⇒ j<||l||+1 ⇒ ¬i = j ⇒ ¬[x / l][i] = [x / l][j]
| 5. i : ℕ
| 6. i<||l||
| 7. x = l[i]
| 8. ¬[x / l][0] = [x / l][(i+1)]
| ⊢  False
|   by ...
|
.\
. 1. T : Type
. 2. l : T List
. 3. x : T
. 4. ∀i,j:ℕ. i<||l|| ⇒ j<||l|| ⇒ ¬i = j ⇒ ¬l[i] = l[j]
. 5. ¬(x ∈ l)
. 6. i : ℕ
. 7. j : ℕ
. 8. i<||l||+1
. 9. j<||l||+1
. 10. ¬i = j
. ⊢  ¬[x / l][i] = [x / l][j]
.   by CaseNat 0 ‘i’ THEN CaseNat 0 ‘j’ THEN Reduce 0 THEN Auto’
.
.      THEN RWO "select_cons_tl" 0 THENA Auto
.
.      THEN Try (BackThruSomeHyp THEN Auto’)
.
.      THEN Try (ParallelOp 5 THEN Unfold ‘l_member‘ 0 )
.
.      THEN Try (InstConcl [j-1] THEN Complete Auto’)
.
.      THEN Try (InstConcl [i-1] THEN Complete Auto’)
.
END
```