```
firstn_all  THM

⊢  ∀L:Top List, n:ℤ. ||L||≤n ⇒ (firstn(n;L) ~ L)
| by InductionOnList THEN Reduce 0 THEN Try (Complete Auto)
|
1. Top List
2. u : Top
3. v : Top List
4. ∀n:ℤ. ||v||≤n ⇒ (firstn(n;v) ~ v)
⊢  ∀n:ℤ. ||v||+1≤n ⇒ (firstn(n;[u / v]) ~ [u / v])
| by RepeatFor 2 (Analyze 0)
|
1. Top List
2. u : Top
3. v : Top List
4. ∀n:ℤ. ||v||≤n ⇒ (firstn(n;v) ~ v)
5. n : ℤ
6. ||v||+1≤n
⊢  firstn(n;[u / v]) ~ [u / v]
| by RecUnfold `firstn` 0 THEN Reduce 0 THEN SplitOnConclITE
|
|\
| .....truecase .....
| 1. Top List
| 2. u : Top
| 3. v : Top List
| 4. ∀n:ℤ. ||v||≤n ⇒ (firstn(n;v) ~ v)
| 5. n : ℤ
| 6. ||v||+1≤n
| 7. 0<n
| ⊢  [u / firstn(n-1;v)] ~ [u / v]  by Analyze THEN Try Trivial
| |
| 1. Top List
| 2. Top
| 3. v : Top List
| 4. ∀n:ℤ. ||v||≤n ⇒ (firstn(n;v) ~ v)
| 5. n : ℤ
| 6. ||v||+1≤n
| 7. 0<n
| ⊢  firstn(n-1;v) ~ v  by BackThru 4
|
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. .....falsecase .....
. 1. Top List
. 2. u : Top
. 3. v : Top List
. 4. ∀n:ℤ. ||v||≤n ⇒ (firstn(n;v) ~ v)
. 5. n : ℤ
. 6. ||v||+1≤n
. 7. n≤0
. ⊢  nil ~ [u / v]  by Auto
END
```