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find_property  THM

⊢  ∀T:Type, P:(T→𝔹), as:T List, d:T.
|  ((first a ∈ as s.t. P(a) else d) ∈ as)
|  ∨ (first a ∈ as s.t. P(a) else d) = d
| by InductionOnList THEN Unfold ‘find‘ 0 THEN Reduce 0

|    THEN Try SimpConcl
THEN SplitOnConclITE THENA Auto

|    THEN Reduce 0
THEN Try (Fold ‘find‘ 0)
|
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| 1. T : Type
| 2. P : T→𝔹
| 3. T List
| 4. u : T
| 5. v : T List
| 6. ∀d:T.
|    ((first a ∈ v s.t. P(a) else d) ∈ v)
|    ∨ (first a ∈ v s.t. P(a) else d) = d
| 7. P(u)
| ⊢  ∀d:T. (u ∈ [u / v]) ∨ u = d
|   by Auto THEN OrLeft THENA Auto THEN Easy
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. 1. T : Type
. 2. P : T→𝔹
. 3. T List
. 4. u : T
. 5. v : T List
. 6. ∀d:T.
.    ((first a ∈ v s.t. P(a) else d) ∈ v)
.    ∨ (first a ∈ v s.t. P(a) else d) = d
. 7. ¬P(u)
. ⊢  ∀d:T.
.    ((first a ∈ v s.t. P(a) else d) ∈ [u / v])
.    ∨ (first a ∈ v s.t. P(a) else d) = d
.   by ParallelOp (-2) THEN ParallelOp (-1) THEN Easy
END
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