```
swapped_select  THM

⊢  ∀T:Type, L1,L2:T List, i,j:ℕ||L1||.
|  L2 = swap(L1;i;j)
|  ⇒
|  L2[i] = L1[j] & L2[j] = L1[i] & ||L2|| = ||L1|| & L1 = swap(L2;i;j)
|  & (∀x:ℕ||L2||. ¬x = i ⇒ ¬x = j ⇒ L2[x] = L1[x])  by Auto
|
1. T : Type
2. L1 : T List
3. L2 : T List
4. i : ℕ||L1||
5. j : ℕ||L1||
6. L2 = swap(L1;i;j)
⊢  L2[i] = L1[j] & L2[j] = L1[i] & ||L2|| = ||L1|| & L1 = swap(L2;i;j)
|  & (∀x:ℕ||L2||. ¬x = i ⇒ ¬x = j ⇒ L2[x] = L1[x])
| by AssertBY ||L2|| = ||L1||
| ( HypSubst (-1) 0 THEN Auto

|        THEN BackThruLemma ‘swap_length‘ THEN Auto)
THEN AssertBY
|    L2 = swap(L1;i;j)
|  (EqTypeCD THEN Auto )

|    THEN Unfold ‘guard‘ 0 THEN Auto THEN HypSubst 8 0 THEN Auto

|    THEN Try (D (-1) THEN Complete Auto’)

|    THEN Try (RWO "swap_select" 0 THENA Auto

|              THEN Unfold ‘flip‘ 0 THEN Reduce 0

|              THEN Repeat (SplitOnConclITE THEN Auto’)

|              THEN HypSubstSq (-1) 0 THEN Auto)
|
1. T : Type
2. L1 : T List
3. L2 : T List
4. i : ℕ||L1||
5. j : ℕ||L1||
6. L2 = swap(L1;i;j)
7. ||L2|| = ||L1||
8. L2 = swap(L1;i;j)
⊢  L1 = swap(swap(L1;i;j);i;j)  by RWO "swap_swap" 0 THEN Auto
END
```