```
effect_subst_mentions_trace  THM

⊢  ∀A:ioa{i:l}(), as:(Label×Term) List, k:Label.
|  ¬ioa_mentions_trace(A) ⇒
|  (∀i:ℕ.
|   i<||as|| ⇒
|   2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i])))
|  ⇒
|  ¬subst_mentions_trace(as)  by Auto
|
1. A : ioa{i:l}()
2. as : (Label×Term) List
3. k : Label
4. ¬ioa_mentions_trace(A)
5. ∀i:ℕ.
|  i<||as|| ⇒
|  2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
⊢  ¬subst_mentions_trace(as)
| by ...
THEN ExRepD THEN InstWithVar (-2) (-3) THENA Auto
|
|
1. A : ioa{i:l}()
2. as : (Label×Term) List
3. k : Label
4. ∀i:ℕ.
|  i<||as|| ⇒
|  2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
5. i : ℕ||as||
6. mentions_trace(2of(as[i]))
7. 2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
⊢  ioa_mentions_trace(A)
| by ...
THEN ExRepD THEN Unfold ‘ioa_mentions_trace‘ 0

|    THEN RepeatFor 2 (OrLeft THENA Auto)
|
1. A : ioa{i:l}()
2. as : (Label×Term) List
3. k : Label
4. ∀i:ℕ.
|  i<||as|| ⇒
|  2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
5. i : ℕ||as||
6. mentions_trace(2of(as[i]))
7. s : smt()
8. s ∈ action_effect(k;A.eff;A.frame)
9. s.lbl =l 1of(as[i])
10. 2of(as[i]) = s.term
⊢  ∃e:eff(). e ∈ A.eff & mentions_trace(e.smt.term)
| by Unfold ‘action_effect‘ (-3) THEN RW ColMemberC (-3) THEN D (-3)
|
|\
| 1. A : ioa{i:l}()
| 2. as : (Label×Term) List
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| 3. k : Label
| 4. ∀i:ℕ.
|    i<||as|| ⇒
|    2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
| 5. i : ℕ||as||
| 6. mentions_trace(2of(as[i]))
| 7. s : smt()
| 8. ∃e:eff(). e ∈ A.eff & e.kind =₁ k & s = e.smt
| 9. s.lbl =₁ 1of(as[i])
| 10. 2of(as[i]) = s.term
| ⊢  ∃e:eff(). e ∈ A.eff & mentions_trace(e.smt.term)
|   by ParallelOp (-3) THEN Auto THEN SubstFor e.smt 0 THEN SubstFor
|      s.term 0
| THEN Auto
|
.\
. 1. A : ioa{i:l}()
. 2. as : (Label×Term) List
. 3. k : Label
. 4. ∀i:ℕ.
. |  i<||as|| ⇒
. |  2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
. 5. i : ℕ||as||
. 6. mentions_trace(2of(as[i]))
. 7. s : smt()
. 8. ∃f:frame().
. |  f ∈ A.frame & ¬₂k ∈ f.acts & s = mk_smt(f.var, f.var, f.typ)
. 9. s.lbl =₁ 1of(as[i])
. 10. 2of(as[i]) = s.term
. ⊢  ∃e:eff(). e ∈ A.eff & mentions_trace(e.smt.term)
. | by ExRepD THEN Assert ¬mentions_trace(2of(as[i])) THEN Auto
.
. |    THEN SubstFor 2of(as[i]) 0 THENM SubstFor s 0 THEN Auto
. |
. 1. A : ioa{i:l}()
. 2. as : (Label×Term) List
. 3. k : Label
. 4. ∀i:ℕ.
.    i<||as|| ⇒
.    2of(as[i]) ∈ smts_eff(action_effect(k;A.eff;A.frame);1of(as[i]))
. 5. i : ℕ||as||
. 6. mentions_trace(2of(as[i]))
. 7. s : smt()
. 8. f : frame()
. 9. f ∈ A.frame
. 10. ¬₂k ∈ f.acts
. 11. s = mk_smt(f.var, f.var, f.typ)
. 12. s.lbl =₁ 1of(as[i])
. 13. 2of(as[i]) = s.term
. ⊢  ¬mentions_trace(mk_smt(f.var, f.var, f.typ).term)
.   by Reduce 0 THEN SimpConcl
END
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