```
his_sum_rep_wd  THM

⊢  ∀'a,'b:S.
|  all
|  (λf:hbool
|   → 'a
|   → 'b
|   → hbool. equal
|            (is_sum_rep(f)
|            ,...))
| by Unab [`his_sum_rep`] THEN Simpsetp [`hol_to_nuprl`]
|    THEN
|    StrongAuto
|
1. 'a : S
2. 'b : S
3. f : hbool → 'a → 'b → hbool
⊢  (∃_b u:'a+'b. (f =_b (rep_sum(u))))
|  =
|  (∃_b v1:'a
|     ∃_b v2:'b
|       ((f =_b (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2 b))
|       ∨_2 (f =_b (λb:hbool. λx:'a. λy:'b. (y =_b v2)∧_2 ¬_2 b))))
| by Simpsetp [`bequal`] THEN StrongAuto
|
|\
| 1. 'a : S
| 2. 'b : S
| 3. f : hbool → 'a → 'b → hbool
| 4. ∃u:'a+'b. f = rep_sum(u)
| ⊢  ∃v1:'a, v2:'b.
| |  f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2 b)
| |  ∨ f = (λb:hbool. λx@0:'a. λy:'b. (y =_b v2)∧_2 ¬_2 b)
| | by Analyze 4 THEN Analyze 4 THEN StrongAuto THEN Unab [`hrep_sum`]
| |    THEN
| |    Simp
| |    THEN
| |    StrongAuto
| |
| |\
| | 1. 'a : S
| | 2. 'b : S
| | 3. f : hbool → 'a → 'b → hbool
| | 4. x : 'a
| | 5. f = (λb:𝔹. λx@0:'a. λy:'b. (x@0 =_b x)∧_2 b)
| | ⊢  ∃v1:'a, v2:'b.
| |    f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2 b)
| |    ∨ f = (λb:hbool. λx@0:'a. λy:'b. (y =_b v2)∧_2 ¬_2 b)
| |   by CDTerms cons(x; cons(arb('b); nil)) THEN StrongAuto
| |      THEN
| |      SomeDisjunct Trivial
| |      THEN
| |      StrongAuto
| |
| .\
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```
| . 1. 'a : S
| . 2. 'b : S
| . 3. f : hbool → 'a → 'b → hbool
| . 4. y : 'b
| . 5. f = (λb:𝔹. λx:'a. λy@0:'b. (y@0 =_b y)∧_2¬_2b)
| . ⊢  ∃v1:'a, v2:'b.
| .     f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2b)
| .     ∨ f = (λb:hbool. λx@0:'a. λy:'b. (y =_b v2)∧_2¬_2b)
| .   by CDTerms cons(arb('a); cons(y; nil)) THEN StrongAuto
| .      THEN
| .      SomeDisjunct Trivial
| .      THEN
| .      StrongAuto
|
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. 1. 'a : S
. 2. 'b : S
. 3. f : hbool → 'a → 'b → hbool
. 4. ∃v1:'a, v2:'b.
. |  f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2b)
. |  ∨ f = (λb:hbool. λx@0:'a. λy:'b. (y =_b v2)∧_2¬_2b)
. ⊢  ∃u:'a+'b. f = rep_sum(u)  by Lasts 3 Analyze THEN StrongAuto
. |
. |\
. | 1. 'a : S
. | 2. 'b : S
. | 3. f : hbool → 'a → 'b → hbool
. | 4. v1 : 'a
. | 5. 'b
. | 6. f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2b)
. | ⊢  ∃u:'a+'b. f = rep_sum(u)
. | | by Subst (f = (λb:𝔹. λx:'a. λy:'b. (x =_b v1)∧_2b)) 0
. | |
. | 1. 'a : S
. | 2. 'b : S
. | 3. f : hbool → 'a → 'b → hbool
. | 4. v1 : 'a
. | 5. 'b
. | 6. f = (λb:hbool. λx:'a. λy:'b. (x =_b v1)∧_2b)
. | ⊢  ∃u:'a+'b. (λb:𝔹. λx:'a. λy:'b. (x =_b v1)∧_2b) = rep_sum(u)
. |   by DTerm inl(v1) 0 THEN StrongAuto
. |      THEN
. |      Try (Complete (Unfold `label` 0))
. |      THEN
. |      Unab [`hrep_sum`]
. |      THEN
. |      Simp
. |      THEN
. |      StrongAuto
. |
. .\
. . 1. 'a : S
. . 2. 'b : S
. . 3. f : hbool → 'a → 'b → hbool
. . 4. 'a
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. . 5. v2 : 'b
. . 6. f = (λb:hbool. λx@0:'a. λy:'b. (y =_b v2)∧_2¬_2b)
. . ⊢  ∃u:'a+'b. f = rep_sum(u)
. .   by DTerm inr(v2) 0 THEN StrongAuto THEN Unab [‘hrep_sum‘]
. .      THEN
. .      Simp
. .      THEN
. .      StrongAuto
END
```