```
discrete__product  THM

⊢  ∀T1:Type{i}, T2:Type{j}.
|  Discrete{T1} ⇒ Discrete{T2} ⇒ Discrete{(T1×T2)}  by UnivCD
|
1. T1 : Type
2. T2 : Type
3. Discrete{T1}
4. Discrete{T2}
⊢  Discrete{(T1×T2)}
| by OnHyps [0;3;4] (λi.UnfoldTopAb i) THEN UnivCD
|
3. ∀x,y:T1. Dec(x = y)
4. ∀x,y:T2. Dec(x = y)
5. x : T1×T2
6. y : T1×T2
⊢  Dec(x = y)  by UnfoldTopAb 0 THEN Analyze 6 THEN Analyze 5
|
5. x1 : T1
6. x2 : T2
7. y1 : T1
8. y2 : T2
⊢  <x1,x2> = <y1,y2> ∨ ¬<x1,x2> = <y1,y2>
| by Witness3 x1 THEN With y1 (Analyze -1) THEN Analyze -1
|    THEN
|    Witness3 x2
|    THEN
|    With y2 (Analyze -1)
|    THEN
|    Analyze -1
|
|\
| 3. x1 : T1
| 4. x2 : T2
| 5. y1 : T1
| 6. y2 : T2
| 7. x1 = y1
| 8. x2 = y2
| ⊢  <x1,x2> = <y1,y2> ∨ ¬<x1,x2> = <y1,y2>
|   by DNth 1 0 THEN MemberEqCD
|
|\
| 3. x1 : T1
| 4. x2 : T2
| 5. y1 : T1
| 6. y2 : T2
| 7. x1 = y1
| 8. ¬x2 = y2
| ⊢  <x1,x2> = <y1,y2> ∨ ¬<x1,x2> = <y1,y2>  by DNth 2 0
| |
| ⊢  ¬<x1,x2> = <y1,y2>  by Analyze 0
| |
| 9. <x1,x2> = <y1,y2>
| ⊢  False  by ApFunToHypEquands ‘p’ 2of(p) T2 9
| |
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| 10. 2of(<x1,x2>) = 2of(<y1,y2>)
| ⊢  False  by AbReduce 10
| |
| 10. x2 = y2
| ⊢  False  by RenameVar ‘zz’ 10 THEN Witness8 zz
|
|\
| 3. x1 : T1
| 4. x2 : T2
| 5. y1 : T1
| 6. y2 : T2
| 7. ¬x1 = y1
| 8. x2 = y2
| ⊢  <x1,x2> = <y1,y2> ∨ ¬<x1,x2> = <y1,y2>  by DNth 2 0
| |
| ⊢  ¬<x1,x2> = <y1,y2>  by Analyze 0
| |
| 9. <x1,x2> = <y1,y2>
| ⊢  False  by ApFunToHypEquands ‘p’ 1of(p) T1 9
| |
| 10. 1of(<x1,x2>) = 1of(<y1,y2>)
| ⊢  False  by AbReduce 10
| |
| 10. x1 = y1
| ⊢  False  by RenameVar ‘zz’ 10 THEN Witness7 zz THEN Trivial
|
.\
. 3. x1 : T1
. 4. x2 : T2
. 5. y1 : T1
. 6. y2 : T2
. 7. ¬x1 = y1
. 8. ¬x2 = y2
. ⊢  <x1,x2> = <y1,y2> ∨ ¬<x1,x2> = <y1,y2>  by DNth 2 0
. |
. ⊢  ¬<x1,x2> = <y1,y2>  by Analyze 0
. |
. 9. <x1,x2> = <y1,y2>
. ⊢  False  by ApFunToHypEquands ‘p’ 2of(p) T2 9
. |
. 10. 2of(<x1,x2>) = 2of(<y1,y2>)
. ⊢  False  by AbReduce 10
. |
. 10. x2 = y2
. ⊢  False  by RenameVar ‘zz’ 10 THEN Witness8 zz
END
```