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connex_iff_trichot  THM

⊢  ∀R:(T→T→Prop).
|  (∀a,b:T. Dec(R(a,b)))
|  ⇒
|  (Connex(T;x,y.R(x,y))
|   ⟺
|   (∀a,b:T.
|    strict_part(x,y.R(x,y);a;b)
|    ∨ Symmetrize(x,y.R(x,y);a;b)
|    ∨ strict_part(x,y.R(x,y);b;a)))  by Unfold ‘guard‘ 0
|
⊢  ∀T:Type, R:(T→T→Prop).
|  (∀a,b:T. Dec(R(a,b)))
|  ⇒
|  (Connex(T;x,y.R(x,y))
|   ⟺
|   (∀a,b:T.
|    strict_part(x,y.R(x,y);a;b)
|    ∨ Symmetrize(x,y.R(x,y);a;b)
|    ∨ strict_part(x,y.R(x,y);b;a)))
| by Unfolds [‘connex‘;‘strict_part‘;‘symmetrize‘] 0 THEN GenRepD
|
|\
| 1. T : Type
| 2. R : T→T→Prop
| 3. ∀a,b:T. Dec(R(a,b))
| 4. ∀x,y:T. R(x,y) ∨ R(y,x)
| 5. a : T
| 6. b : T
| ⊢  R(a,b) & ¬R(b,a) ∨ R(a,b) & R(b,a) ∨ R(b,a) & ¬R(a,b)
| | by (InstHyp [a;b] 4) THEN GenExRepD
| |
| |\
| | 7. R(a,b)
| | ⊢  R(a,b) & ¬R(b,a) ∨ R(a,b) & R(b,a) ∨ R(b,a) & ¬R(a,b)
| |   by (Decide R(b,a)) THEN ProveProp
| |
| .\
| . 7. R(b,a)
| . ⊢  R(a,b) & ¬R(b,a) ∨ R(a,b) & R(b,a) ∨ R(b,a) & ¬R(a,b)
| .   by (Decide R(a,b)) THEN ProveProp
|
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. 1. T : Type
. 2. R : T→T→Prop
. 3. ∀a,b:T. Dec(R(a,b))
. 4. ∀a,b:T. R(a,b) & ¬R(b,a) ∨ R(a,b) & R(b,a) ∨ R(b,a) & ¬R(a,b)
. 5. x : T
. 6. y : T
. ⊢  R(x,y) ∨ R(y,x)  by (InstHyp [x;y] 4) THEN ProveProp
END
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