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┆  $\forall [T:\text{Type}]. \forall [P:T \rightarrow \mathbb{P}]. \forall [C:\mathbb{P}].$ 
|  $((C \vee (\neg C)) \Rightarrow (\forall x:T. ((P x) \vee C)) \Rightarrow ((\forall x:T. (P x)) \vee C))$ 
|
BY RepeatFor 3 ((UD THENA Auto))
|
[1]. T: Type
[2]. P: T  $\rightarrow$   $\mathbb{P}$ 
[3]. C:  $\mathbb{P}$ 
┆  $(C \vee (\neg C)) \Rightarrow (\forall x:T. ((P x) \vee C)) \Rightarrow ((\forall x:T. (P x)) \vee C)$ 
|
BY RepeatFor 2 ((D 0 THENA Auto))
|
4.  $C \vee (\neg C)$ 
5.  $\forall x:T. ((P x) \vee C)$ 
┆  $(\forall x:T. (P x)) \vee C$ 
|
BY D 4
| \
| 4. C
| ┆  $(\forall x:T. (P x)) \vee C$ 
| |
1 BY (OrRight THENA Auto)
| |
| ┆ C
| |
1 BY NthHyp 4
\
4.  $\neg C$ 
┆  $(\forall x:T. (P x)) \vee C$ 
|
BY (OrLeft THENA Auto)
|
┆  $\forall x:T. (P x)$ 
|
BY (D 0 THENA Auto)
|
6. x: T
┆ P x
|
BY (SimpleInstHyp [x] 5. THENA Auto)
|
7.  $(P x) \vee C$ 
┆ P x
|
BY D 7
| \
| 7. P x
| ┆ P x
| |
1 BY NthHyp 7
\
7. C
┆ P x
|

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|
BY (Unfold 'not' 4 THEN D 4)
| \
| 4.  $\forall x:T. ((P x) \vee C)$ 
| 5.  $x: T$ 
| 6.  $C$ 
|  $\vdash C$ 
| |
1 BY NthHyp 6
  \
  4.  $\forall x:T. ((P x) \vee C)$ 
  5.  $x: T$ 
  6.  $C$ 
  7.  $\text{False}$ 
   $\vdash P x$ 
  |
  BY FalseHD 7

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Extract:

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 $\lambda f,g. \text{case } f \text{ of}$ 
   $\text{inl}(c) \Rightarrow \text{inr } c$ 
|  $\text{inr}(nc) \Rightarrow \text{inl } (\lambda x. \text{case } g \ x \ \text{of}$ 
   $\text{inl}(p) \Rightarrow p$ 
  |  $\text{inr}(c) \Rightarrow \text{any } (nc \ c))$ 

where  $f : C \vee (\sim C)$ 
       $g : \forall x:T. ((P x) \vee C)$ 
       $c : C$ 
       $nc : \sim C \equiv (C \Rightarrow \text{False})$ 
       $p : P x$ 

```