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```
##
## Type Instantiation of the Axiom of Choice with Hypothesis
##
##
## Source: [Kubota 2018 (new)]
##
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## Written by Ken Kubota (<mail@kenkubota.de>).
##
## This file is part of the publication of the mathematical logic  $\mathcal{R}_0$ .
## For more information, visit: <http://doi.org/10.4444/100.10>
##
```

```
<< definitions1.r0.txt
<< K8005.r0.txt
```

```
##
## Axiom of Choice
##
## Source: [Andrews 2002 (ISBN 1-4020-0763-9), p. 236]
##
```

```
:= AC  $\exists_{o(o\backslash 3)\tau}(t(ot))_{\tau}[\lambda j_{t(ot)} \cdot (\forall_{o(o\backslash 3)\tau}(ot)_{\tau}[\lambda p_{ot} \cdot (\supset_{ooo}(\exists_{o(o\backslash 3)\tau} t_{\tau}[\lambda x_t \cdot (p_{ot} x_t)_o])(p_{ot}(j_{t(ot)} p_{ot})))_o])_o]$ 
# wff 1386 :  $\exists(t(ot))[\lambda j \cdot (\forall(ot)[\lambda p \cdot (\supset(\exists t[\lambda x \cdot (p x)])(p(j p)))])]_o := AC$ 
```

```
##
## Quantified Axiom of Choice (without a free type variable)
##
## Source: [Kubota 2018 (new)]
##
```

```
:= QAC  $\forall_{o(o\backslash 3)\tau} \tau_{\tau}[\lambda t_{\tau} \cdot AC_o]$ 
# wff 1388 :  $\forall \tau [\lambda t \cdot AC]_o := QAC$ 
```

```
## .1
```

```
%K8005
#  $\supset x x := K8005$ 
#  $\supset_{ooo} x_o x_o := K8005$ 
```

```
## use Proof Template A5221 (Sub):  $B \rightarrow B [x/A]$ 
:= $B5221 %0
# wff 1357 :  $\supset x x_o, \dots := $B5221 K8005$ 
```

```

:= $T5221 o
# wff 2 : oτ := $T5221
:= $X5221 xo
# wff 16 : xo := $X5221
:= $A5221  $\forall_{o(o\setminus 3)\tau}\tau[\lambda t_\tau.AC_o]$ 
# wff 1388 :  $\forall \tau[\lambda t.AC]_o$  := $A5221 QAC
<< A5221.r0t.txt
:= $B5221
:= $T5221
:= $X5221
:= $A5221
%0
#  $\supset QAC QAC$ 
#  $\supset_{ooo}QAC_oQAC_o$ 

## .2

## use Proof Template A5215H ( $\forall I$ ):  $H \supset \forall x: B \rightarrow H \supset B [x/a]$ 
:= $T5215H  $\tau$ 
# wff 0 :  $\tau_\tau$  := $T5215H
:= $X5215H  $t_\tau$ 
# wff 4 :  $t_\tau$  := $X5215H
:= $A5215H  $o$ 
# wff 2 :  $o_\tau$  := $A5215H
:= $H5215H %0
# wff 1425 :  $\supset QAC QAC_{o,\dots}$  := $H5215H
<< A5215H.r0t.txt
:= $T5215H
:= $X5215H
:= $A5215H
:= $H5215H
%0
#  $\supset QAC (\exists (o(oo)) [\lambda j.(\forall (oo) [\lambda p.(\supset (\exists o [\lambda x.(p x)]) (p (j p))]])])$ 
#  $\supset_{ooo}QAC_o\dots$ 
 $\dots (\exists_{o(o\setminus 3)\tau}(o(oo))_\tau [\lambda j_{o(oo)}.(\forall_{o(o\setminus 3)\tau}(oo)_\tau [\lambda p_{oo}.(\supset_{ooo}(\exists_{o(o\setminus 3)\tau}o_\tau [\lambda x_o.(p_{oo}x_o)_o])(p_{oo}(j_{o(oo)}p_{oo}))_o])_o])$ 

```