Phi 201: Precept 7

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April 9, 2018

Existential Introduction (EI): From P, infer $\exists x P[x/n]$, where the variable in this case x replaces ANY NUMBER of occurrences of a constant such as n. Example:

1	(1)	$Dn \vee Pn$	A
1	(2)	$\exists x(Dx \vee Px)$	1 EI

Existential Elimination (EE): From $\exists x P$ and assuming $P[a/x]$, where a constant such as a replaces ALL occurrences of the variable in this case x, if C may be inferred from $P[a/x]$, we may infer C from the three, provided that the arbitrary instance in this case a does NOT occur in C and does NOT occur in the dependencies of any of the assumptions on which the ultimate conclusion is rested. The conclusion inherits as dependencies those of the first and those of the third without the second, and so will not rest on $P[a/x]$ as an assumption. Example:

1	(1)	$\exists x(Dx)$	A
2	(2)	Da	A
2	(3)	$Da \vee Aa$	2 $\vee$I
2	(4)	$\exists x(Dx \vee Ax)$	3 EI
1	(5)	$\exists x(Dx \vee Ax)$	1,2,4 EE

Exercises. Answer the following questions:

(1) What are the intuitions behind EI and EE? Explain the reasoning in your own words.

(2) What are the intuitions behind UE and UI? Explain the reasoning in your own words.

(3) How are EI and UE similar? How are EE and UI similar?

Exercises. If valid, prove. If not, provide counterexample:

(1) $\vdash \forall x(Fx \vee \sim Fx)$

(2) $\forall x Fx \vdash \exists x Fx$ (!!!)

(3) $\exists x Fx \vdash \exists x \exists y(Fx \wedge Fy)$

(4) $\vdash \exists x(\exists y Fy \rightarrow Fx)$

(5) $\sim \exists x Fx \dashv\vdash \forall x \sim Fx$

(6) $\sim \forall x Fx \dashv\vdash \exists x \sim Fx$