

FOL Proofs

PHIL-205-01:Symbolic Logic

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TFL is fun and all, but it doesn't allow us to prove truths. So, lets take the rules of TFL and go to FOL

1 Conversion of Quantifiers

This allows us to move a negation into or out of a sentence:

$m. \forall x \neg Dx$ $n. \neg \exists x Dx$	CQ: m
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This can be done in either direction, and with either quantifier. Note that if a sentence has multiple quantifiers, this rule must be done for each quantifier.

2 Universal Elimination

$m. \forall x Fx$ $n. Fa$	\forallElim: 1
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3 Existential Introduction

$m. Fa$ $n. \exists x Fx$	\existsIntro: m
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4 Universal Introduction

This is incredibly hard, because we have to prove that *any* value is true. That being said, it will basically never be used, because its not a tool we need very often.

$m. \forall x Fx$ $n. Fb$ $o. \forall y Fy$	\forallElim: m \forallIntro: n
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5 Existential Elimination

The goal of this rule isn't actually to remove the existential quantifier. Its as part of a subproof, generally.

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	m. $\exists xAx$
	i. Ac
	— j. $\exists xBx$
	r. $\exists xBx$

$\exists\mathbf{Elim}:m, i - j$