

Lógica Computacional 1

Cálculo de Sequentes na LPO

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Prove os sequentes a seguir em Dedução Natural e no Cálculo de Sequentes:

1. $\vdash (\forall x \varphi) \rightarrow (\exists x \varphi)$
2. $\vdash (\forall x \forall y p(x, y)) \rightarrow (\forall y \forall x p(x, y))$
3. $\vdash (\exists x \exists y p(x, y)) \rightarrow (\exists y \exists x p(x, y))$
4. $\vdash (\forall x \varphi) \rightarrow (\neg(\exists x \neg \varphi))$
5. $\vdash (\exists x \varphi) \rightarrow (\neg(\forall x \neg \varphi))$
6. $\vdash (\forall x(\varphi \rightarrow \psi)) \rightarrow ((\forall x \varphi) \rightarrow (\forall x \psi))$
7. $\vdash ((\forall x \varphi) \wedge (\forall x \psi)) \rightarrow (\forall x(\varphi \wedge \psi))$
8. $\vdash (\forall x(\varphi \wedge \psi)) \rightarrow ((\forall x \varphi) \wedge (\forall x \psi))$
9. $\vdash ((\exists x \varphi) \vee (\exists x \psi)) \rightarrow (\exists x(\varphi \vee \psi))$
10. $\vdash (\exists x(\varphi \vee \psi)) \rightarrow ((\exists x \varphi) \vee (\exists x \psi))$
11. $\vdash (\exists x(\varphi \wedge \psi)) \rightarrow ((\exists x \varphi) \wedge (\exists x \psi))$
12. $\vdash ((\forall x \varphi) \vee (\forall x \psi)) \rightarrow (\forall x(\varphi \vee \psi))$

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