

Ricardo Queiroz de Araujo Fernandes

**Proximity-based Understanding of
Conditionals**

TESE DE DOUTORADO

DEPARTAMENTO DE INFORMÁTICA
Programa de Pós-Graduação em Informática

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August 2012



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Thesis presented to the Programa de Pós-Graduação em Informática of the Departamento de Informática of PUC-Rio as partial fulfillment of the requirements for the degree of Doutor em Informática.

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To my wife Sabrina and my son Eduardo.

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Resumo

Fernandes, Ricardo Queiroz de Araujo; Haeusler, Edward Hermann.
Compreensão de condicionais a partir da proximidade. Rio de Janeiro, 2012. 87p. Tese de doutorado — Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

Apresentamos uma lógica para a compreensão de condicionais a partir da proximidade (PUC-Logic) que unifica as lógicas Contrafactual e Deontica propostas por David Lewis. Propomos também um sistema de dedução natural (PUC-ND) associado a essa nova lógica. Esse sistema de inferência é correto, completo, normalizável e decidível. A completude relativa para as lógicas V e CO é apresentada para dar ênfase à abordagem unificada sobre o trabalho de Lewis. Depois disso, apresentamos uma perspectiva construtivista para mostrar que a abstração contrafactual de Lewis não exige a regra do absurdo clássico.

Palavras-chave

Condicionais; Lógica; Dedução natural; Lógica contrafactual; Lógica deontica

Abstract

Fernandes, Ricardo Queiroz de Araujo; Haeusler, Edward Hermann (Advisor). **Proximity-based Understanding of Conditionals**. Rio de Janeiro, 2012. 87p. DSc Thesis — Departamento de Informática, Pontifícia Universidade Católica do Rio de Janeiro.

We present a logic for Proximity-based Understanding of Conditionals (PUC-Logic) that unifies the Counterfactual and Deontic logics proposed by David Lewis. We also propose a natural deduction system (PUC-ND) associated to this new logic. This inference system is proven to be sound, complete, normalizing and decidable. The relative completeness for the **V** and **CO** logics is shown to emphasize the unified approach over the work of Lewis. We, then, present a constructive approach to counterfactuals to show that the Lewis counterfactual abstraction does not require the classical absurd rule.

Keywords

Conditionals; Logic; Natural deduction; Counterfactual logic; Deontic logic

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*Não fez Deus o céu em xadrez de estrelas, como
os pregadores fazem o sermão em xadrez de
palavras.*

Padre Antonio Vieira, *Sermão da Sexagésima.*