

On the Issue of Contraposition of Defeasible Rules

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Rule based versus Assumption based

→ $p \Rightarrow q$

*(Pollock, Prakken&Sartor,
DeLP, ASPIC, ...)*

→ $p \supset q$

(Besnard&Hunter, BDKT, ...)

Contraposition and Counter Examples

“Men usually do not have beards”

$\text{man} \Rightarrow \neg \text{beard}$

Does it then follow that:

$\text{beard} \Rightarrow \neg \text{man}$

*“If someone has a beard,
then it's usually not a man.”*

Contraposition and Counter Examples

contraposition:

man \Rightarrow \neg beard

\neg/\neg beard \Rightarrow \neg man

left conjunction:

mary(sue) \Rightarrow happy,

mary(ann) \Rightarrow happy

\neg/\neg mary(sue) & mary(ann) \Rightarrow happy

transitivity:

student \Rightarrow adult,

adult \Rightarrow employed

\neg/\neg student \Rightarrow employed

Contraposition or not

- ⇒ If we allow counter examples against contraposition, then we should also allow counter examples against more established principles of defeasible reasoning
- ⇒ Perhaps we should allow contraposition as a *defeasible* principle
- ⇒ In many “counter examples” against contraposition, the antecedent is a *negative* factor for the consequent:
 - man $\Rightarrow \neg$ beard
 - human $\Rightarrow \neg$ diabetics
 - lottery_ticket $\Rightarrow \neg$ winning

Epistemical vs. Constitutive reasoning

TMA, $TMA \Rightarrow A$, $A \Rightarrow CD$, LIS, $LIS \Rightarrow \neg CD$

S, $S \Rightarrow M$, $M \Rightarrow R$, P, $P \Rightarrow \neg R$

Epistemical vs. Constitutive reasoning

“word to world” (Searle)

TMA, $TMA \Rightarrow A$, $A \Rightarrow CD$, LIS, $LIS \Rightarrow \neg CD$

S, $S \Rightarrow M$, $M \Rightarrow R$, P, $P \Rightarrow \neg R$

“world to word” (Searle)

Epistemical vs. Constitutive reasoning

Epistemical (Hage)

TMA, TMA \Rightarrow A, A \Rightarrow CD, LIS, LIS \Rightarrow \neg CD

S, S \Rightarrow M, M \Rightarrow R, P, P \Rightarrow \neg R

constitutive (Hage)

Constitutive Reasoning and Contraposition

move, move \Rightarrow people, people \Rightarrow $O(\neg\text{shoot})$
order, order \Rightarrow $O(\text{shoot})$

Constitutive Reasoning and Contraposition

snore, snore \Rightarrow misbeh, misbeh \Rightarrow P(remove)
prof, prof \Rightarrow \neg P(remove)

Concluding Remarks

- ⇒ argument construction is *not* trivial
- ⇒ fundamental differences exist between epistemic and constitutive reasoning
- ⇒ research question:
which kind of argumentation formalisms are suitable for which domains?