Ranking-Based Semantics from the Perspective of Claims

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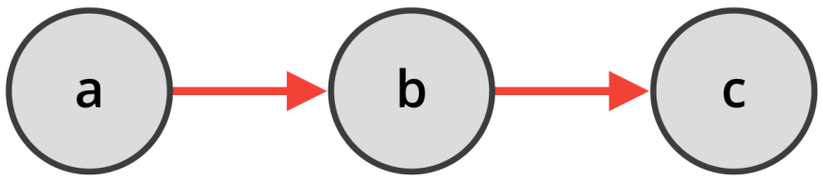
We study ranking-based semantics in the context of Claim Augmented Frameworks.

Overview

- Background notions
- Ranking claims on CAFs
    1. Desired properties
    2. Lifting via Lexicographic Order
    3. (Revisited properties of ranking semantics)
- Conclusion and future work

Ranking-based semantics

- Classical “Dung’s” semantics: **accepted** / **rejected** Dung 1995
- Labelling-based semantics: addition of **undec** Caminada 2006
- Finer grain? Ranking over arguments

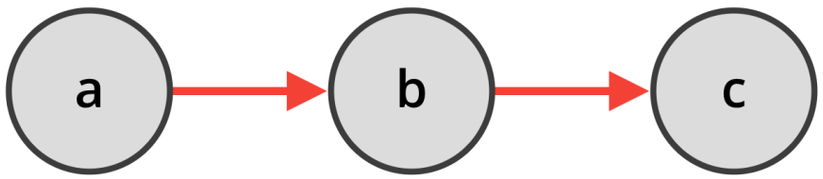


Ranking-based semantics

- Classical “Dung’s” semantics: **accepted** / **rejected**
- Labelling-based semantics: addition of **undec**
- Finer grain? Ranking over arguments
- How does one evaluate the arguments?

Some ranking/graded semantics:

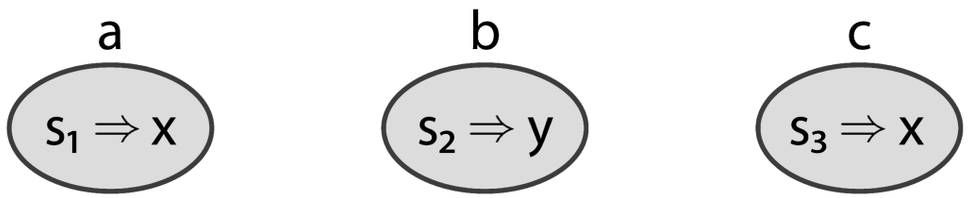
- AB2013
- Bonzon 2016
- Thimm 2018
- Dondio 2018
- GM2019



Claim Augmented Frameworks

- Claim Augmented Frameworks (📖DW2010): arguments stands for a particular claim (or conclusion)

- Extensions of standard semantics of the underlying AF can be interpreted in terms of claims



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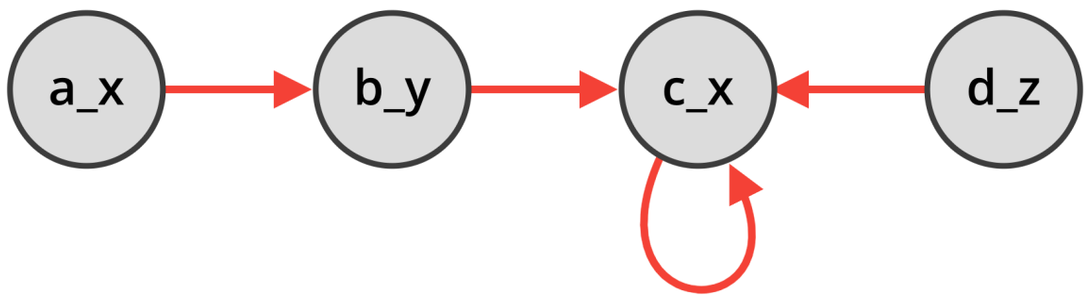

Ranking claims on CAFs

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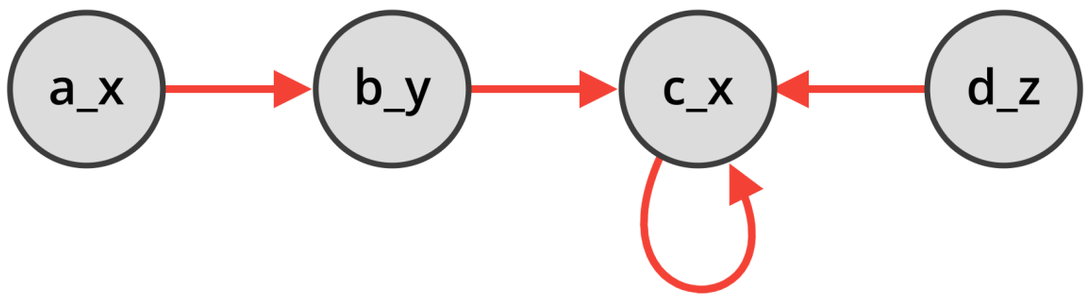
- How to lift argument-ranking to claim-ranking?
- Replacing arguments with their claims in the ranking does not work…
  - example: $a \simeq d \succ b \succ c \longrightarrow x \simeq z \succ y \succ x$?



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- A claim-based ranking semantics associates with any CAF CF a total pre-order $\succcurlyeq_{CF}$ on X_{CF}

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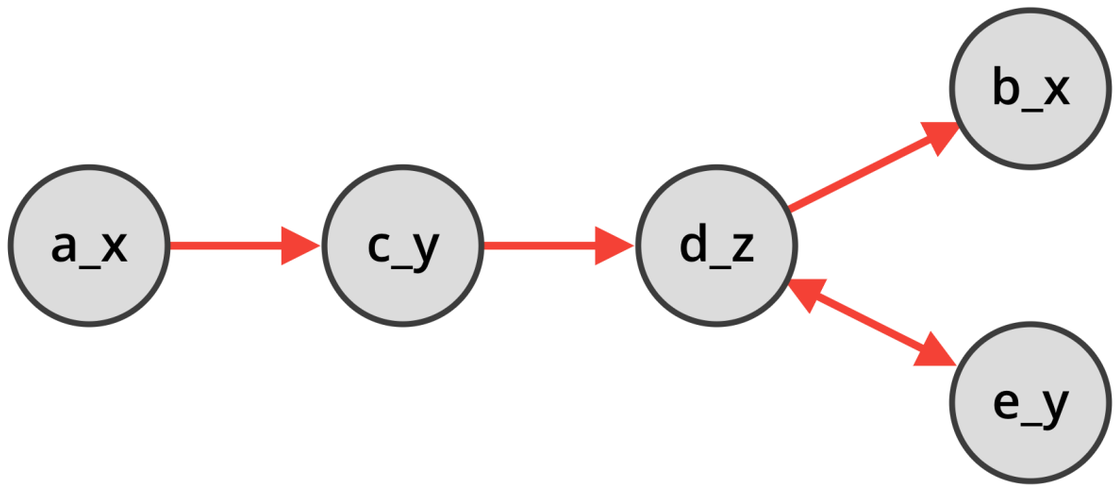
$$a_x \succcurlyeq e_y \succ d_z \succ b_x \succcurlyeq c_y \implies x \succcurlyeq y$$

Claim x supported by: a, b

Claim y supported by: e, c



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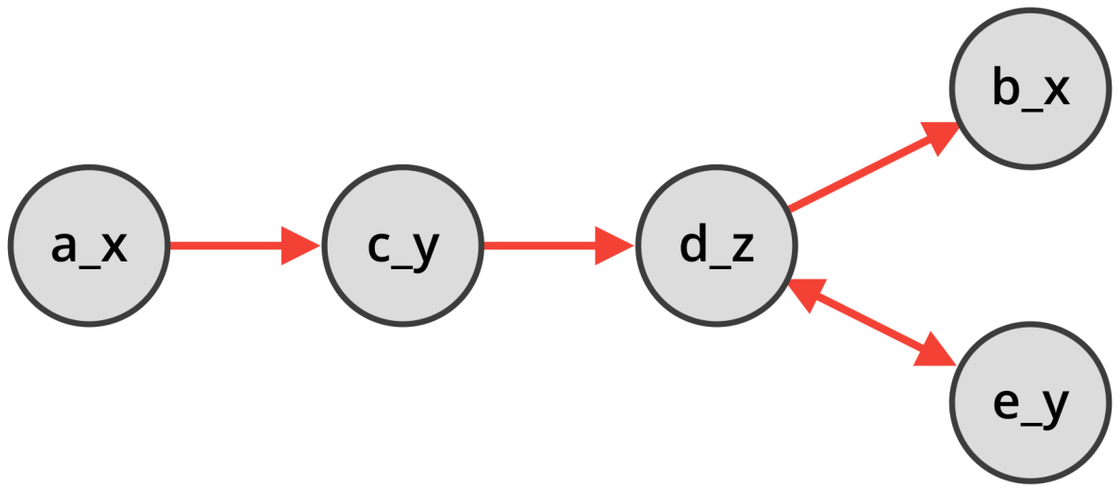

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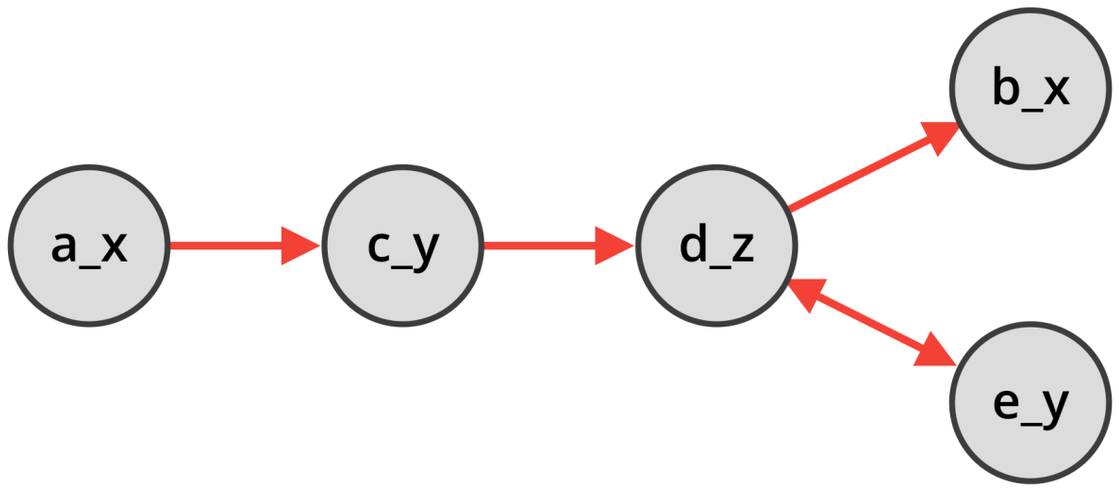

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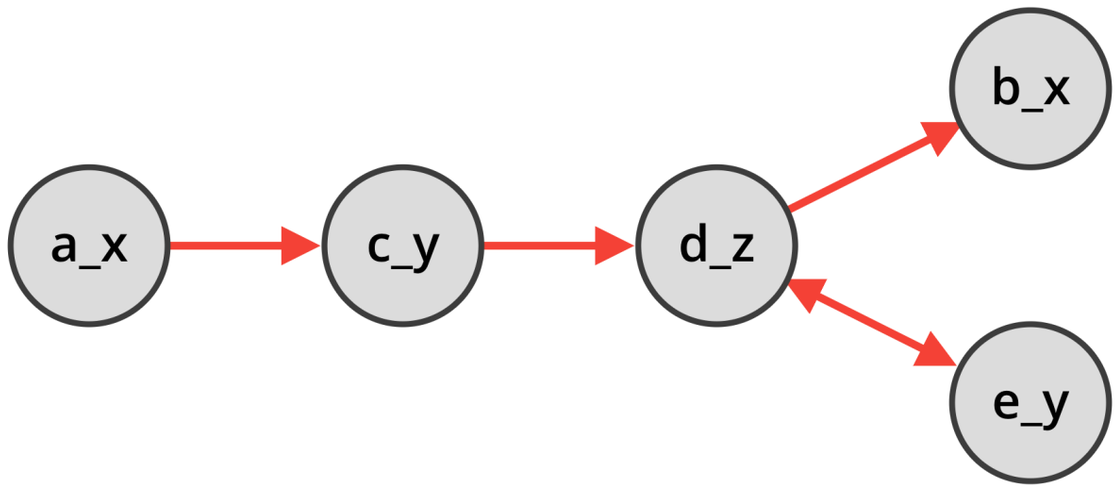

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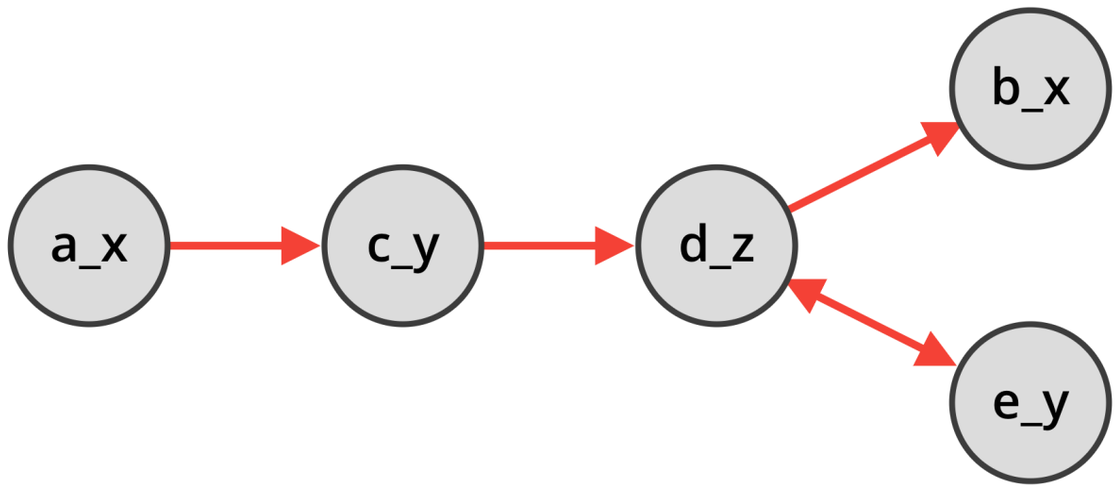

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$x \succcurlyeq y$	$x \succ y$
$A_x = \{a, b\}$	$A_x = \{a, b, e\}$
$A_y = \{c, d\}$	$A_y = \{c, d\}$

2) Lifting via Lexicographic Order

Lexicographic order relation $\succcurlyeq^L$:

- $A \succcurlyeq^L \emptyset, \emptyset \not\succcurlyeq^L A,$ for $A \neq \emptyset$
- $A \succcurlyeq^L B \iff i)\ \max(A) \succ \max(B),$ or

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Every lex-lifting of a ranking semantics satisfies:

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What about ranking semantics properties?

3) Revisited properties of ranking semantics

- Abstraction (Abs)
- Independence (Ind)
- Void Precedence (VP)
- Self-contradiction (SC)
- Cardinality Precedence (CP)
- Quality Precedence (QP)
- Counter-Transitivity (CT)
- Strict Counter-Transitivity (SCT)
- Defense Precedence (DP)

- Question: if an argument-ranking satisfies one of the property above, will the corresponding claim-ranking satisfy the revised version of such property?

If $a_x \simeq c_y \succ b_y$ satisfies **VP**,

will $y \succ x$ satisfy **VP** for claims?

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- Some property are only lifted for well-formed (WF) and/or att-unitary (AU) CAFs

	Abs	Ind	VP	SC	CP	QP	CT	SCT	DP
C-	all	all	AU	WF and AU	none	none	none	none	none
AC-	all	WF or AU	all	all	AU	AU	AU	AU	AU

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2. We introduced some desirable properties (**SD**, **SSD**, **GSD**) and showed that the lex-lifting satisfies them

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Study on **ranking-based semantics** in the context of **CAFs**

1. **Lex-lifting**: lift an argument-ranking to the level of the claims using a **lexicographic order** relation

2. We introduced some desirable properties (**SD**, **SSD**, **GSD**) and showed that the lex-lifting satisfies them

3. We studied **which properties hold** for which classes of CAFs after a lex-lifting

   - approach 1: solely considering claims
   - approach 2: considering arguments with the same claim

Future Work

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3) Claim-based ranking properties

- Void Precedence

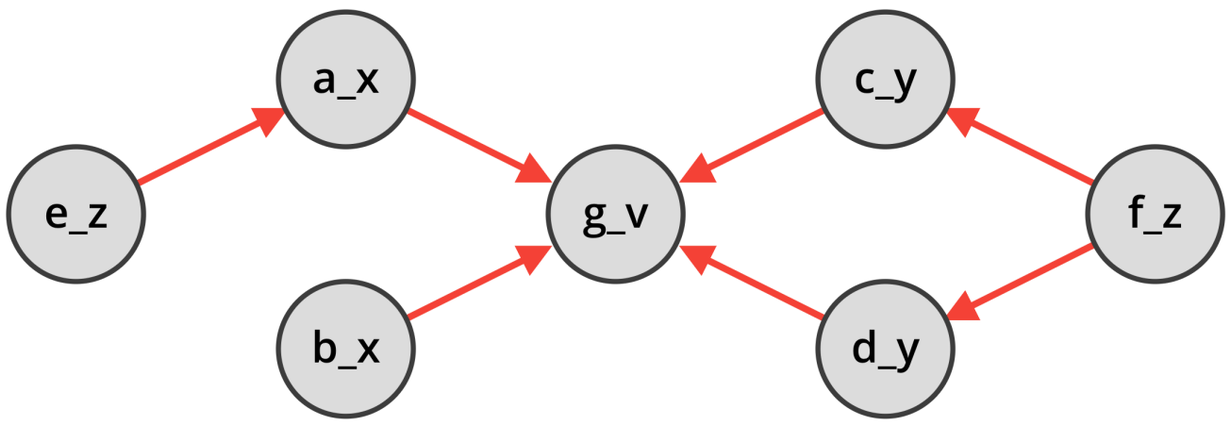
VP: $\forall a, b \in A_F \,.\, (a^- = \emptyset \wedge b^- \neq \emptyset) \implies a \succ b$

C-VP: $\forall x, y \in X_{CF} \,.\, (x^- = \emptyset \wedge y^- \neq \emptyset) \implies x \succ y$

A claim with a non-attacked supporter is better than any claim for which all the supporters are attacked

AC-VP: $\forall x, y \in X_{CF} \,.\, (\exists a \in A_x : a^- = \emptyset \wedge \forall b \in A_y \,.\, b^- \neq \emptyset) \implies x \succ y$

$x \succ y$



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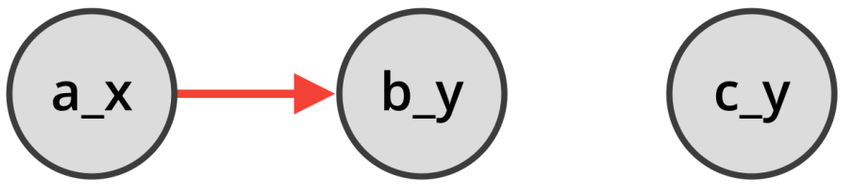
- $a \simeq c \succ b$ satisfies **VP**
- $y \succ x$ does not satisfy **C-VP**
- $y \succ x$ satisfies **AC-VP**



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