Argumentation among Agents: Review and Commentary

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Introduction

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- Our contribution: several new examples, and proofs for some merely stated claims.
- What is the author attempting to formalize?
- The philosopher's view of argumentation: the giving of claims in favor or against a statement that is open for debate.

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- S, D are respectively the sets of strict/defeasible inference rules.

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- If $\varphi \in \mathit{cont}(\psi)$, then
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- It is mandatory that

$$\neg\varphi \in \mathit{cont}(\varphi) \quad \text{and} \quad \varphi \in \mathit{cont}(\neg\varphi)$$

for any formula φ.

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- An *argument* from a knowledge base $\mathcal{K}$ is defined similarly to a deduction in propositional logic. (The members of $\mathcal{K}$ play the role of the hypotheses.)
- Major difference: incorporation of the used inference rules.
- The complete framework contains a partial order on defeasible rules. Using it, arguments may be compared.

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- Note how the structure of arguments is not taken into account anymore.
- Objective: define an "acceptable" argument.

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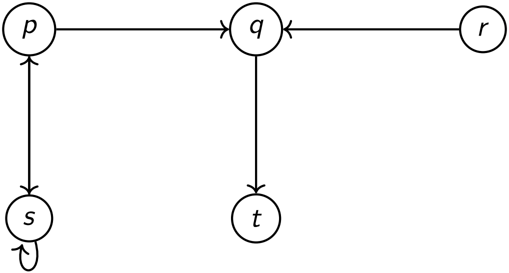

Figure: Our argumentation framework.

- $S^+ =$ the set of arguments defeated by some member of S.

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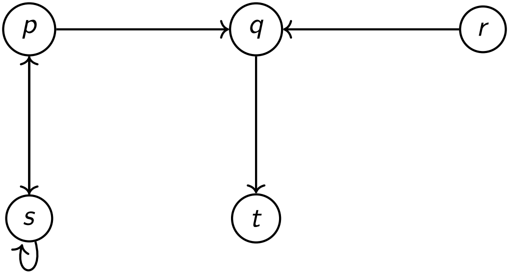

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- In the figure, $\{p, q\}^+ = \{q, s, t\}$.

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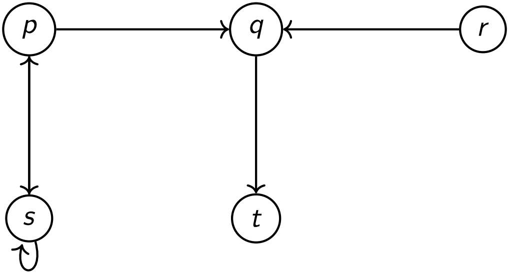

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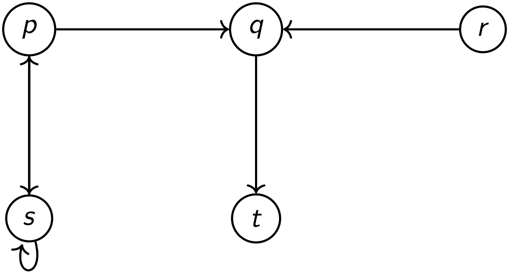

Figure: Our argumentation framework.

- $a^- =$ the set of arguments which defeat a.
- In the figure, $s^- = \{p, s\}$.

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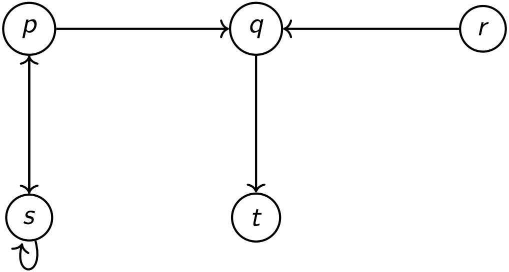

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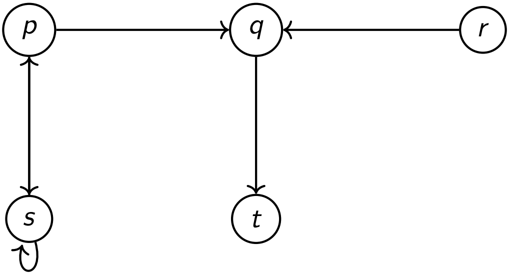

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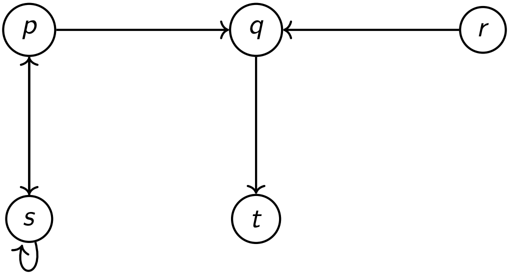
- A set S of arguments is *conflict-free* if no argument in S defeats another also in S.
- In the figure, $\{p, t\}$ and $\{r, t\}$ are conflict-free.

Dung's model



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- A set S of arguments *defends* argument a if every argument which defeats a is defeated by S (i.e., is in S^+).

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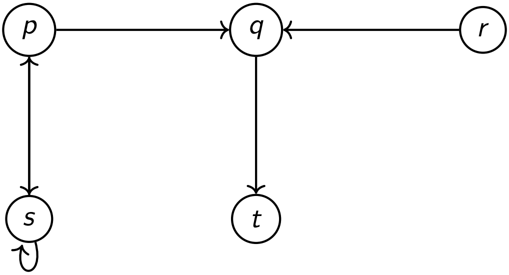

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- A set S of arguments *defends* argument a if every argument which defeats a is defeated by S (i.e., is in S^+).
- In the figure, $\{p, t\}$ defends p.

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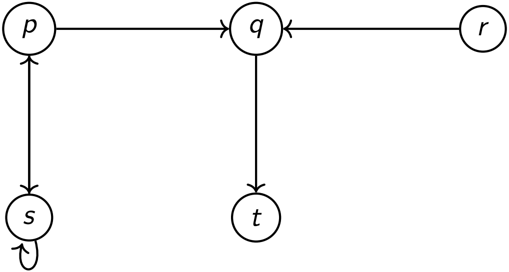

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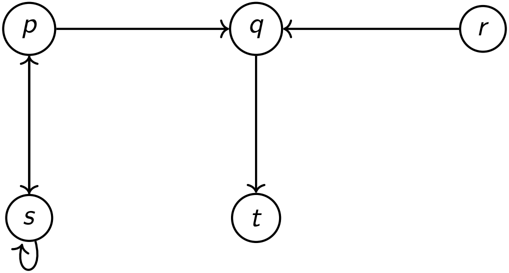

Figure: Our argumentation framework.

- The *characteristic function* $\mathcal{F}$ is defined thus:
  $$\mathcal{F}(S) = \text{ the set of arguments defended by } S.$$
- In the figure, $\mathcal{F}(\{p, q, r\}) = \{p, r, t\}$ and $\mathcal{F}(\{r, t\}) = \{r, t\}$.

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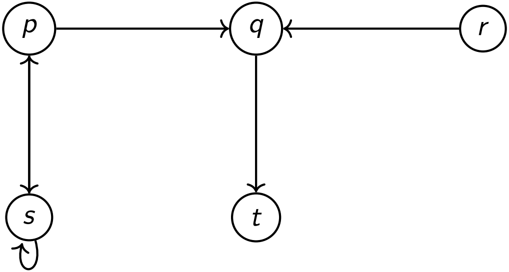

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- A *complete extension* is a set S of arguments which is conflict-free and such that $\mathcal{F}(S) = S$ (i.e., it defends its own members and nothing else).

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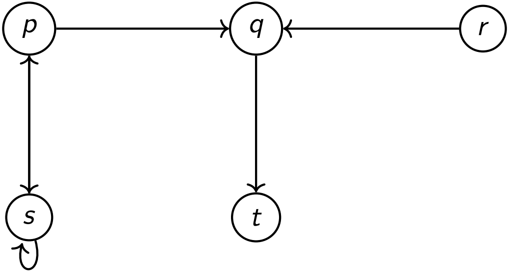

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- A *complete extension* is a set S of arguments which is conflict-free and such that $\mathcal{F}(S) = S$ (i.e., it defends its own members and nothing else).
- By the remarks on previous slides, $\{r, t\}$ is a complete extension.

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- An argument p is:
  - *skeptically accepted* iff p belongs to every extension;
  - *credulously accepted* iff p belongs to some extension;
  - *rejected* iff p doesn't belong to any extension.