Université de Paris

SAT solvers

Computational Models of Argumentation

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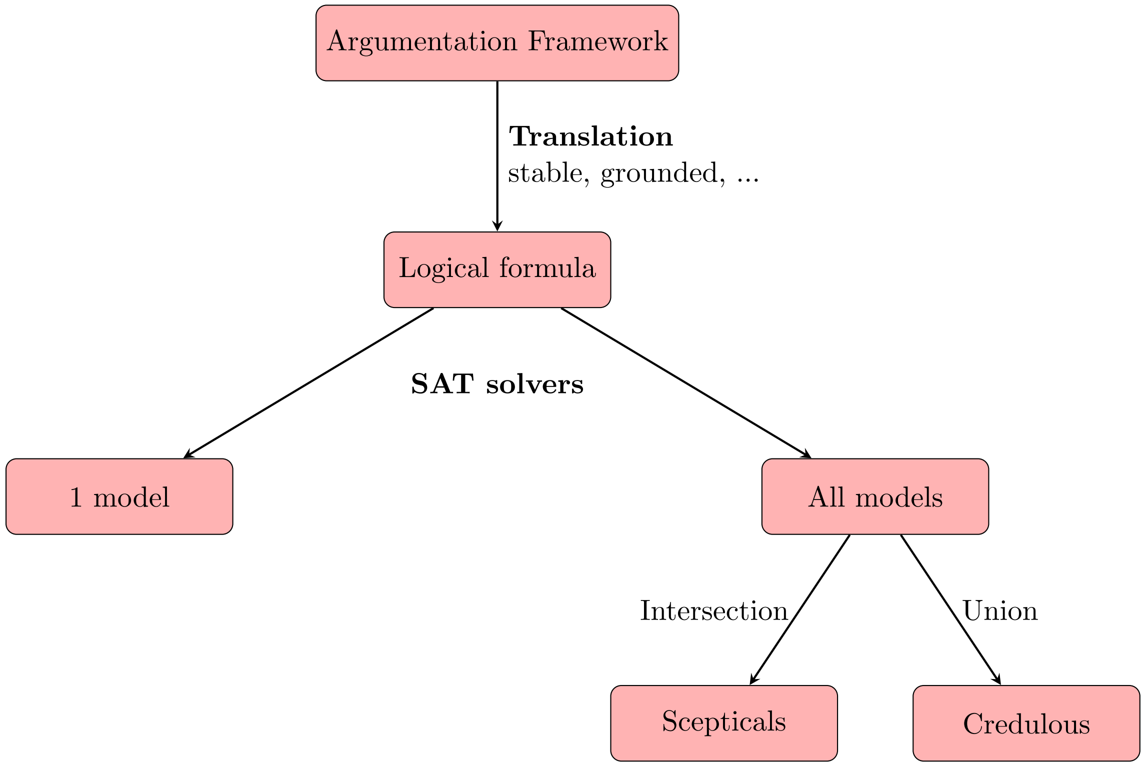
1 Flowchart



Argumentation Framework
Translation
stable, grounded, ...
Logical formula
SAT solvers
1 model
All models
Intersection
Union
Scepticals
Credulous

2 Extensions

Let $F := (A, R)$ be an Argumentation Framework and $S \subset A$, then S is

- **conflict-free** if for all (a, b) in S^2, (a, b) is not in R.

$$\phi_{cf}(F) = \bigwedge_{(a,b)\in R} \neg a \vee \neg b$$

- **admissible** if S is conflict-free and defends all its arguments.

$$\phi_{ad}(F) = \phi_{cf}(F) \wedge \bigwedge_{a\in A} \left(a \implies \bigwedge_{(b,a)\in R} \bigvee_{(c,b)\in R} c \right)$$

- **complete** if S is admissible and contains all the arguments that it defends.

$$\phi_{co}(F) = \phi_{cf}(F) \wedge \bigwedge_{a\in A} \left(a \iff \bigwedge_{(b,a)\in R} \bigvee_{(c,b)\in R} c \right)$$

- **grounded** if S is complete and that there is no complete extension $S' \neq S$ such that $S' \subset S$. Apply unit propagation to ϕ_{co}.

- **preferred** if S is complete and that there is no complete extension $S' \neq S$ such that $S \subset S'$. There is no encoding to SAT. Instead, use ϕ_{co} and if the solution is not preferred, forbid it in the logical formula and try again.

- **stable** if S is conflict-free and attacks all the arguments it does not contain.

$$\phi_{st}(F) = \bigwedge_{a\in A} \left(a \iff \bigwedge_{(b,a)\in R} \neg b \right)$$

3 Schema

In the schema below, the arrow is an implication.