

Playing Lorenzen dialogue games on the web

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Playing dialogue games

- **Problem:** Standard dialogue rules can often be unintuitive and difficult to consistently apply, especially when playing games in one's head or with pencil-and-paper.
- **Solution:** Let's let our computer take care of determining whether the rules are being followed, allowing us to explore standard and non-standard rulesets with confidence.
- **Desiderata:** Make a system that's available on the web.
- **Desiderata:** The tool should permit experimentation with dialogue games.



Our site: dialogical-logic.info

- Our work-in-progress is live at <http://dialogical-logic.info>.
- One chooses an initial formula from a selected list of ‘famous (propositional) formulas’, or inputs a (propositional) formula.
- One can play either as Proponent or Opponent (the other player chooses his moves randomly), or, for full control, one can play as both players.
- One of the site’s most useful features is its ability to display, given a state of a dialogue game, *all available next moves*; just follow a link to make the corresponding move.

One can also enter a formula manually and see which rules are violated by the proposed play.

- One can search for winning plays or winning strategies (a kind of function that ensures the existence of winning plays ‘no matter what the other guy does’).



Computing winning plays and winning strategies

- Computing winning plays can be challenging; computing winning strategies is even more difficult (the problem can be **PSPACE**-complete, by the earlier theorem, in the case of intuitionistic logic).
- We employ a handful of heuristics to guide the search through the space of plays and strategies:
 - [Best-first] Disprefer (or even ignore) moves that repeat an earlier move.
 - [Best-first] In the presence of the rule *Proponent cannot assert an atomic formula before Opponent does*, consider first moves that correspond to assertions by Opponent of an atomic formula.
 - [Fail-first] In the presence of the rule *Proponent's assertions may be attacked at most once*, prefer considering defensive moves by Opponent.

