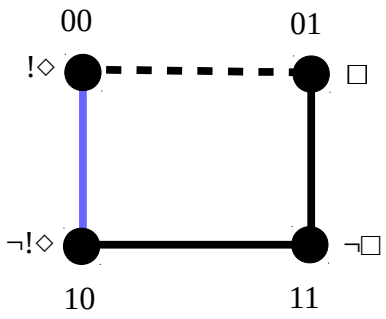
Chirality in Answered Modal Logic

by Daniel Fischer, Sven Nilsen

In this paper we show that Answered Modal Logic can be contracted to 3 equivalent ternary logics.

Answered Modal Logic[1] has 3 contractible sides that form 3 equivalent ternary logics:



This shows that Answered Modal Logic has chirality, an idea suggested by Daniel Fischer.
Notice that there is a mirror symmetry along the `not` operation (which is unavoidable).
The mirror symmetry vanishes when distinguishing between equal and equivalent ternary logics.

Here are the 3 truth tables for AND[2]:

11 ~= 01	10 ~= 11	00 ~= 10
00 00 => 00	00 00 => 00	00 00 => 00
00 01 => 00	00 01 => 00	00 01 => 00
00 10 => 00	00 10 => 00	00 11 => 00
01 00 => 00	01 00 => 00	01 00 => 00
01 01 => 01	01 01 => 01	01 01 => 01
01 10 => 10	01 10 => 10	01 11 => 11
10 00 => 00	10 00 => 00	11 00 => 00
10 01 => 10	10 01 => 10	11 01 => 11
10 10 => 10	10 10 => 10	11 11 => 11

It is easy to see that “11 ~= 01” has same truth table as “10 ~= 11”.
The truth table of “00 ~= 10” is constructed from the 2 others by replacing “10” with “11”.

References:

[1] “Answered Modal Logic”
Sven Nilsen, 2020
https://github.com/advancedresearch/path_semantics/blob/master/papers-wip/answered-modal-logic.pdf

[2] “Truth Tables for Answered Modal Logic”
Sven Nilsen, 2020
https://github.com/advancedresearch/path_semantics/blob/master/papers-wip/truth-tables-for-answered-modal-logic.pdf