

# Human Reasoning and the Weak Completion Semantics II

## Technische Universität Dresden

### Exercise 2

Steffen Hölldobler, Meghna Bhadra

May 4, 2022

**Note:** Please consider the equational theory and the set of integrity constraints to be empty for each question, until stated otherwise.

#### Problem 1

In this exercise we will try to simulate the core idea behind Schrödinger's famous thought experiment. Hence, please consider the following Wikipedia excerpt on the same: *"To further illustrate, Schrödinger described how one could, in principle, create a superposition in a large-scale system by making it dependent on a quantum particle that was in a superposition. He proposed a scenario with a cat in a locked steel chamber, wherein the cat's life or death depended on the state of a radioactive atom, whether it had decayed and emitted radiation or not. According to Schrödinger, the Copenhagen interpretation implies that the cat remains both alive and dead until the state has been observed. Schrödinger did not wish to promote the idea of dead-and-live cats as a serious possibility; on the contrary, he intended the example to illustrate the absurdity of the existing view of quantum mechanics."*

The following statements (somewhat) depicts the scenario:

If there is no observer looking inside the steel chamber then the cat is dead. If there is no observer looking inside the steel chamber then the cat is alive. If there is a quantum collapse of the radioactive atom then it releases some poison. If any poison is released then the cat is dead. If any poison is not released then the cat is alive.

- Let the set of integrity constraints be empty. What would be the least models of (minimal) abduction applied to the empty observation?
- Now considering the *realistic* constraint that a cat can either be dead or alive but not both, which models persist?
- Given the above constraint, and the fact that Schrödinger's experiment showed the absurdity of basing the superposition of the cat's living state on the presence (or not) of an observer, which statements do you think may be removed from the prior set of statements?
- Would you have formulated the simulation differently? If so, please elaborate.