Probability Theory

Not Strong Enough

March 7, 2020

0.0.1: Exercise 26.

We came across two islanders A and B on Crete Island. "All Cretans are liars.", A said. "I'm lying", B said. Which statement is a paradox?

Proof. For the first statement, assume what A said is correct. Then all Cretans are liars, and what A said should be wrong. This cannot happen since we assume A didn't lie. However, if we assume what A said was wrong(i.e A is a liar), it follows that at least one Cretan who is not a liar. This doesn't contradict with the hypothesis. **Thus, from what A said, we can conclude that A is a liar. And A's statement is not a paradox.**

For the second statement, if we assume B told the truth, then from the former analysis we know that B is a liar, which leads to a contradiction. Likewise, if we assume what B said is wrong, it follows that B didn't lies, which also leads to a contradiction. **So B's statement is a paradox.**

The famous "liar paradox" is exactly the statement which B said. It is one of the self-referential paradoxes. □