Disbelief as the Dual of Belief

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Abstract

The duality of truth and falsity in a Boolean algebra of propositions is used to generate a duality of belief and disbelief. To each additive probability measure that represents belief there corresponds a dual additive measure that represents disbelief. The dual measure has its own peculiar calculus, in which, for example, measures are added when propositions are combined under conjunction. A Venn diagram of the measure has the contradiction as its total space. While additive measures are not self-dual, the epistemic state of complete ignorance is represented by the unique, monotonic, non-additive measure that is self-dual in its contingent propositions. Convex sets of additive measures fail to represent complete ignorance since they are not self-dual.

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