

## Uncertainty in Risk Modeling

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**Abstract :** Conventional quantitative risk management in banking is a risk factor of its own, because it rests on assumptions such as independence and availability of data which do not hold when rare events of extreme consequences are involved. There is a growing recognition of the need for alternative risk measures that do not make these assumptions. We propose a novel method for modeling the risk associated with investment products, in particular derivatives, by using a formal language for specifying financial contracts. Expressions in this language are interpreted in the category of values annotated with (a formal representation of) uncertainty. The choice of uncertainty formalism thus becomes a parameter of the model, so it can be adapted to the particular application and it is not constrained to classical probabilities. We demonstrate our approach using a simple logic-based uncertainty model and a case study in which we assess the risk of counter party default in a portfolio of collateralized loans.

**Keywords :** risk model, uncertainty monad, derivatives, contract algebra

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