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"An Hybrid Global Optimization Method For Credit Portfolio Management"

Continuous development of derivative credit products makes risk management an important activity in asset allocation of financial structures. Credit risk is the risk of trading partners, called counterparties, not fulfilling their obligations on the due date resulting into losses for investors (this includes bankruptcies such as Enron (2001) and WorldCom (2002) cases). The main objective of credit risk management is to provide models and tools allowing to estimate and eventually reduce amount of losses. One of the most important mathematical contribution in this field was the development of risk measures, such as Value at Risk. But, risk measures are highly non linear functions. In addition, credit losses are characterized by large probabilities of small earnings together with small probabilities of large losses. This makes difficult the approximation of the loss density function which is necessary for the evaluation of the risk measure resulting in a non-convex and costly optimization problem. Therefore, one needs efficient global optimization techniques. In literature, many works deal with a convexified version of risk measures, resulting on an over-estimation of the risk.

In this paper, we focus on the application of a new optimization method for the improvement under constraints of credit portfolio performances, namely non-convex risk measures and income. This method is based on the hybridization between a genetic algorithm and an original semi-deterministic method. The portfolio considered here comes from a real case proposed by the "BNP-Paribas"Portfolio Management Team and belongs to a complex category of credit portfolio called Collateralized Loan Obligations (CLO).

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