Interacting Path-Particle System for Multi-name Incomplete Information Credit Risk Model

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Ongoing financial crisis has revealed a serious issue on contagion effects for both credit risk management and evaluating portfolio credit derivatives. Default contagion is a phenomenon where a default by one firm has direct impact on the health of other surviving firms. Several credit models such as reduced-form model and incomplete information structural model have recently incorporated default contagion. For example, multi-name incomplete information structural models are proposed by Kay Giesecke. However, since the closed formula for joint distribution of the first-passage time of correlated multivariate Brownian motion is unknown, the proposed algorithms therein are not directly applicable to correlated firm value cases. In this talk, we present a multi-name incomplete information structural model, which possess the contagion mechanism naturally, along the single-name CreditGrades model of Finger et al. Here, we suppose that investors can observe firm values and defaults but are not informed of the threshold level at which a firm is deemed to default. Also, to analyze the contagion effects under general settings, we consider the dependence structure of firm value dynamics and joint distribution of default thresholds. Our concern is the rare but critical events represented by the tail of loss distribution of portfolio. To address this, we apply Interacting Path-Particle System algorithm based on the non-linear recursive formula and illustrate how this algorithm improve the accuracy of the tail probabilities.