Pricing Catastrophe Bonds with Default Risk using RBF Method

Abodolsadeh Neisy[1], **Stefano De Marchi**[2] **and Mandana Bidarvand**[3]

[1] *Faculty of Mathematics Sciences, Allameh Tabataba'i University,Tehran, Iran*
email: a_neisy@atu.ac.ir

[2] *Department of Mathematics "Tullio Levi-Civita", Padova University, Padova, Italy*
email: demarchi@math.unipd.it

[3] *Faculty of Mathematics Sciences, Allameh Tabataba'i University,Tehran, Iran*
email: mandanabidarvand@gmail.com

In this paper, we study the Catastrophe bonds which are considered the most important products in catastrophe risk securitization and the insurance market. These financial assets which are considered as a link between the capital and the insurance industry market deal with sudden jumps in the prices in the time when incidents happen. Although there are a variety of catastrophe instruments, here we focus on catastrophe bonds (CAT Bonds) which are the largest issued and most successful instrument among all others. In this study, we add another important factor to our model namely, the default risk which is the risk arising from the probability that the instruments issuer will not honor its contractual obligations. We investigate our model by considering a condition in which the loss process is generated by a doubly stochastic Poisson process and the share price process is modeled through a jump-diffusion process which is correlated to the loss process, the interest rate process and the default intensity process are modeled through the Vasicek model. Furthermore, we apply the Radial Basis Function approximation to the resulting PIDE in order to price the CAT bonds prone to the counterparty credit risk.

Keywords: catastrophe bonds; counterparty credit risk; doubly stochastic processes ; Radial Basis Function approximation

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