

*Faculty of Engineering and Natural Sciences
Department of Industrial Engineering
Seminar
Thursday, Octoberber 18, 2012
15:30 pm, Fener Hall*

Fast Simulations in Credit Risk

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Abstrac

We consider the problem of simulating tail loss probabilities and expected losses conditioned on exceeding a large threshold (expected shortfall) for credit portfolios. Our new idea, called the geometric shortcut, allows an efficient simulation for the case of independent obligors. It is even possible to show that, when the average default probability tends to zero, its asymptotic efficiency is higher than that of the naive algorithm. The geometric shortcut is also useful for models with dependent obligors and can be used for dependence structures modeled with arbitrary copulae. The paper contains the details for simulating the risk of the normal copula credit risk model by combining outer importance sampling with the geometric shortcut. Numerical results show that the new method is efficient in assessing tail loss probabilities and expected shortfall for credit risk portfolios. The new method outperforms all known methods, especially for credit portfolios consisting of weakly correlated obligors and for evaluating the tail loss probabilities at many thresholds in a single simulation run.

Biography

Dr. Halis Sak is an Assistant Professor in the department of Industrial and Systems Engineering at Yeditepe University. He received his B.S. in Mechanical Engineering from Middle East Technical University and M.S. and Ph.D. in Industrial Engineering from Boğaziçi University. Prior to joining Yeditepe University, he spent 2 years as a postdoctoral researcher in the department of Statistics and Mathematics at the WU Vienna University of Economics and Business. His research interests include risk management, the pricing of derivative securities, Monte Carlo simulation, and biostatistics.