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EDITORIAL

Editorial

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This special issue is published following research presented at the 15th conference on Computational Management Science held at the Norwegian University of Science and Technology (NTNU), Trondheim, in May/June 2018. The CMS conference is an annual meeting associated with the journal Computational Management Science published by Springer. This edition of the conference is co-organised by NTNU Faculty of Economics and Management, CMS Journal and the EURO Working Groups on Stochastic Optimization (EWGSO) and Commodity and Financial Modelling (EWGFM).

The conference focused on computational management science with emphasis on valuation problems, risk management and measurement applications, including optimal risk control problems, typically employing stochastic optimization, robust and distributionally robust optimization methods as in the tradition of CMS conferences. Increasingly over the years the conference has attracted scholars from different scientific communities and Euro working groups, ranging from the optimization to the statistical, econometrical and applied maths communities and touching several application domains, including energy, finance, supply chain management and logistics problems.

This special issue is guest edited by professor Stein-Erik Fleten and professor Florentina Paraschiv, and consists of seven articles within the areas above.

Goudenege, Molent and Zanette enhance existing methods with respect to the computational efficiency of credit value adjustments for European and American options. In particular, the methodological advances consist in replacing the Monte Carlo step of the first-difference Monte Carlo approach with a finite difference step and the whole method relies on the efficient solution of two coupled partial integro-differential equations (PIDE). Besides the methodological break-through, the study addresses a core topic of the financial regulatory frame on credit risk management that stresses the importance of marking to market financial derivatives.

In the area of portfolio risk management, two papers address the topic of parameter uncertainty in the context of optimal asset allocation strategies and stress testing exercises. Modern econometrics/machine learning techniques are applied: extreme value theory for extreme tail events in financial returns, copula to address the contagion risk

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and LASSO for return predictability. Rigamonti and Weissensteiner employ a new form of cross-validation to select the penalization parameter for the LASSO which is applied to portfolio weights aiming at limiting extreme positions due to errors in the estimation of model parameters. The stress-testing related paper by Paraschiv, Reese and Skjelstad draws conclusions about parameter risk persistent in stress testing exercises. Finally yet importantly, in line with Basel IIIb, their study highlights the importance of using forward-looking hybrid and hypothetical scenarios over historical scenarios.

For setting up and solving multistage decision problems subject to uncertainty, scenario generation is an essential ingredient. This issue has two papers that contribute to this area. Horejsova, Vitali, Kopa and Moriggia compare seven scenario reduction algorithms, one of which, nodal clustering, is new. These algorithms take a large scenario tree as a starting point, and use either random selection or distance-based criteria to progressively prune the tree. Results are evaluated in a portfolio selection context, looking at both objective function and solution, measuring the distance compared to solving the original large tree. Of the random selection algorithms, the authors identified a winning approach, "scenario extraction". This is important since the computational time to run (and develop) random selection algorithms is lower than those based on nested distance. The latter algorithms produce better performance, not surprisingly, in terms of the distance to the original tree. The new suggestion of the authors, nodal clustering, performs well, but does not dominate when it comes to solution and objective function distance.

Prochazka and Wallace are concerned with limitations of looking only at the distance between some underlying probability distribution and the generated scenario tree, and emphasize that the quality of scenario generation should be gauged with respect to the performance associated with solving the optimization problem at hand. In this volume, they provide an approach to scenario generation where the core criterion for the generated tree is that it minimizes a distance between the in-sample and out-of-sample performance of a pool of solutions to the underlying optimization problem.

Singh, Kneuven and Watson propose a new approach to unit commitment in power system analysis. Their starting point is that many traditional constraints in this problem are based on engineering considerations, regarding for example the nominal range of generator power output. Chance constraints limit the operation outside these bounds, and the authors show that this relaxation has a large cost saving potential. For moderately sized problems, the authors demonstrate that commercial MILP solvers are able to solve instances using sufficiently short time.

Finally, the paper by Lawryshyn, Davison and Miklyukh discusses optimal order quantities under demand uncertainty. They take the viewpoint of a risk averse retail firm that sources from either offshore manufacturers or local manufacturers. These two sources have different lead times, and the authors develop two models that analyse the cases of one versus several local manufacturers. The former case is quasi-analytical, whereas the latter needs to be solved using Monte Carlo methods. The framing of the setup is such that it is quite easy for managers to use these models, since the authors use as main input the managerial estimates of expected demand.

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