Editorial

As one may expect from the subject field of operations research, this issue of ORiON contains four interesting and diverse papers.

The first paper is authored by Linke Potgieter, Jan van Vuuren and Des Conlong. The paper is titled "Modelling the effects of the sterile insect technique applied to *Eldana saccharina* Walker in sugarcane." It provides an approach to model the population dynamics of an *Eldana saccharina* Walker infestation of sugarcane under the influence of partially sterile released insects by means of a deterministic system of difference equations. This model considers the release of fully sterile females, partially sterile males in the native population with more than one life stage and subsequent F1-sterility. Incorporating all these elements into the model yields an extension on existing work. The model is the first to consider the economic viability of the sterile insect technique to *E.saccharina*. The model is solved and recommendations presented that may be used by farm managers to determine the best timing for releases, release ratios and release frequencies in the management of *E.saccharina*.

The second paper, titled "Developing a planning tool for South African prosecution resources: Challenges and approach" by Renee Koen, Jenny Holloway, Chris Elphinstone and Theo Stylianides, suggests a planning tool to model and manage the work balance in the criminal justice environment in South Africa. The design was mainly influenced by the challenges emanating from the special requirements and context of this problem. Resources were not forecasted directly, but were derived with the help of simulation models that traced docket flows. Docket flows were derived as a proportion of reported crimes, and these were forecasted using a multivariate statistical model. The approach consisted of a number of smaller models which could be run independently, and aggregated to a larger entity, for example, a province. The final decision support system uses spreadsheets as a common user interface, enabling prosecutors and managers who may not have extensive mathematical or modelling experience to use the final product.

Ian Durbach and Stephen Davis authored the third paper titled "Decision support for selecting a shortlist of electricity-saving options: A modified SMAA approach." This paper considers a stochastic multi-criteria acceptability analysis (SMAA) approach to determine a shortlist, for marketing purposes, of promising electricity savings options for households in South Africa. This decision problem needs to be solved under conditions of uncertainty regarding the preferences for energy-related attributes. A SMAA model is used to determine the shortlist. It is concluded that simplified SMAA models may be useful, and even preferable, in this type of decision problem.

The final paper, under authorship of Esmarie Scholtz, James Bekker and Delyno du Toit, is titled "Multi-objective optimisation with stochastic discrete-event simulation in retail banking: A case study." The authors consider the problem of replenishing the cash in autoteller machines (ATMs). The presented approach contains three sub models, namely a vehicle routing problem to determine good routes for the cash-in-transit vehicles, an inventory control policy to restock the ATMs with cash, and finally a knapsack problem to determine the optimal dispensing of notes. These three elements are built into a simulation model to improve service levels and minimise cost, resulting in a multi-objective

optimisation problem. The data of 90 different scenarios were simulated to determine a spread of solutions at different cost and service levels to determine a set of Pareto optimal solutions. A manager may use this set of solutions to determine a good strategy, *i.e.* a good trade-off between service level and cost, to manage the replenishment of cash. Finally, the combination of the four OR techniques (simulation, vehicle routing, inventory control and knapsack) proved to be very fruitful in solving this problem.

Publishing a high-quality journal is a team effort which requires hard work. In this regard there are several parties to whom we owe gratitude. Without the authors and their hard work to finish and submit papers we would have nothing to publish, while the effort of the reviewers ensures the quality of the published work. My sincere thanks to the authors and reviewers of ORiON 28(2) for their sterling effort.

I would also like to thank my editorial team. The journal manager Martin Kidd and the typesetting assistant Anton de Villiers are performing an excellent job in respectively handling the management and typesetting of ORiON. Without their help and dedication this publication would be virtually impossible. Your hard work and dedication to ORiON are truly appreciated.

I hope that the range of papers included in this issue will contain something of interest to all of ORiON's readers. Readers are welcome to contact the editor-in-chief with any recommendations or suggestions regarding this publication.

My best wishes to all the authors, reviewers and readers of ORiON for the festive season. May you all experience a happy 2013!

Stephan Visagie
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