Session Detail Information

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Cluster : INFORMS Undergraduate Operations Research Prize

Session Information : Sunday Nov 01, 13:30 - 15:00

Title: INFORMS Undergraduate Operations Research Prize II
Chair: Aurelie Thiele,Lehigh University, 200 W Packer Ave, Bethlehem PA 18015, United States of America, aut204@lehigh.edu

Abstract Details

Title: Piecewise Static Policies For Two-stage Adjustable Robust Optimization Problems Under Uncertainty
Presenting Author: Omar El Housni,Industrial Engineering and Operations Research, Columbia University, 547 Riverside Drive Apt 1B, New York NY 10027, United States of America, omar.el-housni@polytechnique.edu
Co-Author: Vineet Goyal,Associate Professor, Industrial Engineering and Operations Research, Columbia University, 500 West 120th Street, 304 Mudd, New York NY 10027, United States of America, vgoyal@ieor.columbia.edu

Abstract: We consider two-stage adjustable robust linear optimization problems under uncertain constraints and study the performance of piecewise static policies. We show that surprisingly there is no piecewise static policy with polynomial number of pieces with performance significantly better than a static policy in general. We also present a family of piecewise static policy with exponential pieces that has a significantly better performance than a static solution and admits a compact MIP formulation.

Title: Multi-step Bayesian Optimization For One-dimensional Feasibility Determination
Presenting Author: Massey Cashore,University of Waterloo, 200 University Ave W, Waterloo On N2L 3G1, Canada, masseycashore@gmail.com
Co-Author: Peter Frazier,Assistant Professor, Cornell University, 232 Rhodes Hall, Cornell University, Ithaca NY 14850, United States of America, pf98@cornell.edu

Abstract: Bayesian optimization methods allocate limited sampling budgets to maximize expensive-to-evaluate functions. One-step-lookahead policies are often used, but computing optimal multi-step-lookahead policies remains a challenge. We consider a specialized Bayesian optimization problem: finding the superlevel set of an expensive one-dimensional function, with a Markov process prior. We compute the Bayes-optimal sampling policy efficiently, and characterize the suboptimality of one-step lookahead.

Title: Alleviating Competitive Imbalances in NFL Schedules: An Integer Programming Approach
Presenting Author: Kyle Cunningham,Northeastern University, Healthcare Systems Engineering Institute, Boston MA, United States of America, cunningham.k@husky.neu.edu
Co-Author: Mark Karwan,University at Buffalo, 342 Bell Hall, North Campus, Buffalo NY 14260, United States of America, mkarwan@buffalo.edu
Murat Kurt,Merck Research Labs, 351 N. Sumneytown Pike, North Wales PA 19454, United States of America, murat.kurt7@gmail.com
Niraj Pandey,University at Buffalo, 342 Bell Hall, North Campus, Buffalo NY 14260, United States of America, npandey@buffalo.edu

Abstract: While the NFL uses complex rules in scheduling its games, NFL schedules are not robust in creating a consistent competitive appeal. We propose a two-stage MILP approach to reduce competitive disadvantages in schedules arising from various sources including rest differentials due to bye-weeks and Thursday games, long streaks of road games, and short-week travel. Our results for the 2012-2015 seasons indicate that our approach can substantially improve NFL schedules in various fairness metrics.

Title: Robust Multi-Objective Clustering

Presenting Author: **Andy Zheng**,Northwestern University, 1501 Leavenworth, San Francisco CA 94109, United States of America, azheng92@gmail.com

Abstract: We propose a multi-objective method that leverages robust optimization for hierarchical clustering (rMOC). rMOC chooses clusters based on a weighted sum of data-intrinsic objective functions, determining a threshold that is most robust to uncertainties in these weights. We compare this method to the reference methods of K-means and Gaussian mixture models. In terms of misassignment rate, rMOC outperforms both other methods on several benchmark datasets.

Title: Optimizing Community Healthcare Coverage in Remote Liberia through an Integer Linear Programming Model

Presenting Author: **Paige Von Achen**,Northwestern University, Sheridan Road, Evanston, United States of America, PaigeVonAchen2014@u.northwestern.edu

Abstract: Here we present a collaborative effort by the NGO, Last Mile Health, and Northwestern University to aid the expansion of healthcare accessibility throughout remote Liberia. Two integer linear programming models are developed that determine (1) the location assignments of healthcare workers and their supervisors and (2) the routing of the supervisors. We highlight the benefits of rigorous data collection and using a cross-disciplinary team to provide proper scoping and representation of a given problem.