

Department of  
Industrial and Systems  
Engineering

THURSDAY  
SEPT. 29, 2016  
3:00 PM - 4:00 PM  
FAB 103  
(FINE ARTS BUILDING B)



ISE PROFESSOR

*Jean-Philippe Richard received his Ph.D. from the Georgia Institute of Technology in 2002. Dr. Richard serves as a Professor of Industrial and Systems Engineering at the Herbert Wertheim College of Engineering at the University of Florida. His research and teaching focuses on operations research, with special emphasis on both the theoretical and practical sides of Mixed Integer Programming.*

**Jean-Philippe Richard**

## On Cutting Planes for Cardinality-Constrained Linear Programs

We derive cutting planes for cardinality-constrained linear programs (CCLPs). These inequalities can be used to separate any basic feasible solution of an LP relaxation of the problem, assuming that this solution violates the cardinality requirement. To derive them, we first relax the given simplex tableau into a disjunctive set, expressed in the space of non-basic variables. We establish that coefficients of valid inequalities for the closed convex hull of this set obey ratios that can be computed directly from the simplex tableau. We then show that a transportation problem can be used to separate these inequalities. Our results provide a precise characterization of all facet-defining inequalities of the relaxation under study, and identify necessary and sufficient conditions under which a disjunctive cut widely used in the complementarity literature is facet-defining. We conclude by giving a constructive procedure to generate violated facet-defining inequalities for the closed convex hull of the disjunctive set using a variant of Prim's algorithm.

This work is conducted jointly with Mohit Tawarmalani and Jinhak Kim (Krannert School of Management, Purdue University).

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Thursday, September 29, 2016 \* Time: 3:00 pm – 4:00 pm  
Location: FAB 103 (Fine Arts Building B)

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