Linear and Integer Programming vs Linear Integration and Counting

J.-B. Lasserre

LAAS-CNRS
7 Avenue du Colonel Roche, 31 077 Toulouse Cedex 4
lasserre@laas.fr

Mots-clefs : Linear and Integer Programming, Linear Integration and Counting

In this talk we analyze and develop some striking analogies between four related problems, namely linear programming and integer programming on the one hand and linear integration and counting on the other hand. The two former optimization problems are the max-plus algebra analogues of the two latter "integration" problems. The linear integration and counting problems have well-defined duals (although not qualified as such in the literature) obtained from the Laplace and Z-transforms, the analogues of the Fenchel transform to obtain the LP dual. A careful analysis of beautiful results by Barvinok, Brion and Vergne, sheds some interesting light on the links and analogies between the four problems, and in particular on duality for integer programs.