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Economic interpretation of dual multipliers in integer programming: the case of 0 – 1 MILP

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Abstract

In the presence of indivisible goods, resource allocation models often result in mixed-integer linear programs (MILP). Unlike linear programming duality however, MILP problems present duality gaps, and dual variables are not as conveniently interpreted. For a special case of 0 – 1 MILP problems, we show the existence of unique shadow prices and recover the total cost of inputs, even when the underlying model includes indivisibilities that are modeled using integer variables. We also provide an interpretation of certain valid inequalities in the form of productivity requirements that must be satisfied for integer programming problems.

Joint work with Talat Genc (University of Guelph).