1145-90-2271   **Sanjeeb Dash*** (`sanjeebd@us.ibm.com`), IBM T. J. Watson Research Center, 1101 Kitchawan Rd, Yorktown Heights, NY 10520. *Cutting planes from extended formulations of mixed-integer programs.*

We discuss how to use extended formulations of the LP relaxation of a mixed-integer program to obtain stronger split cutting planes than those that can be obtained from the original LP relaxation. We analyze a few different approaches to building extended formulations, and the strength of split cuts in each case. In particular, we consider the Lovász-Schrijver and Sherali-Adams lift-and-project operator hierarchies and show how to define stronger hierarchies, and also discuss extended formulations of mixed-integer programs obtained by replacing integral variables by weighted sums of binary variables. We prove that certain binary extended formulations, studied earlier by Roy, by Bonami and Margot, and by Angulo and Van Vyve, are strongest possible with respect to adding split cuts in the extended space and projecting to the original space. Finally, we discuss the solution of some hard, quadratic, unconstrained optimization problems arising from Ising model problems defined on Chimera graphs, and how cutting planes from extended formulations can reduce solution times.

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