
RICK CARON, University of Windsor, Windsor, ON, N9B 3P4
New Advancements for the Set Covering Paradigm for Constraint Analysis

Hit and Run algorithms, most notably the Hypersphere Directions or HD algorithm and the Coordinate Directions or CD algorithm, originated thirty years ago with the work of Boneh, Smith and Telgen. Since then numerous papers have been written that have either generalized the algorithms, provided theoretical analysis, or adapted the methodology to new situations.

In this paper we present a new generalization for direction choice for both the CD and HD algorithm. We show that this variant keeps all the positive aspects of the algorithms and adds new ones, such as the ability to work with linear equality constraints. We use our generalization with the set covering paradigm introduced by Boneh for constraint analysis and we present new ideas to help determine the number of iterations that should be completed by these probabilistic methods. We demonstrate our advancements with the analysis of systems of linear constraints having both equalities and inequalities.