The CLASH Operator.

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The least absolute shrinkage and selection operator (Lasso) for linear regression exploits the geometric interplay of the ell2-data error objective and the ell1-norm constraint to arbitrarily select sparse models. Guiding this uninformed selection process with sparsity models has been precisely the center of attention over the last decade in order to improve learning performance. To this end, we alter the selection process of Lasso in this talk to explicitly leverage combinatorial sparsity models (CSMs) via the combinatorial selection and least absolute shrinkage operator (CLASH). A highlight is the introduction of a new algorithmic definition of CSMs, which we dub as the Polynomial time Modular epsilon-Approximation Property (PMAP_epsilon). PMAP_epsilon enables us to determine the impact of approximate combinatorial projections within CLASH. We then provide concrete guidelines how to leverage sets with PMAP_epsilon within CLASH, and characterize CLASH's estimation guarantees as a function of epsilon as well as the set restricted isometry constants of the regression matrix. Finally, we present experimental results using both simulated and real world data to demonstrate the effectiveness of CLASH.