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Arbitrary Rectangle-range Generalized Elastic Net Penalty Model and Variable Selection Consistency.

We propose an arbitrary rectangle-range generalized elastic net penalty least squares method (ARGEN) for variable selection. It can be applied in high dimensional sparse linear regression models. Many commonly used methods such as lasso, ridge and elastic net are not only extended but also improved by ARGEN. We proved that ARGEN has variable selection consistency under certain condition which extends the Nonnegative Irrepresentable Condition in elastic net. To construct the estimator of ARGEN, we establish a new algorithm, which is an extension of multiplicative updates approach and is shown to has estimation consistency. We run multiple simulations to show that ARGEN is applicable to more complicated problems and at the same time has better performance, compared with that of commonly used methods. The rectangle-range constrained index tracking problem in stock market is studied in the latter part. The results indicate that ARGEN has small tracking error and is successful in assets selection. (Received September 12, 2019)