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Fractional Ridge Regression

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Abstract

Ridge regression was introduced by Hoerl and Kennard (1970a,b) and twenty-six years later was followed by the introduction of the lasso Tibshirani (1996). The body of research ensuing from these seminal papers is staggering, and has contributed immensely to our understanding of shrinkage and selection methodology and to the practice of regression modeling in many areas of science. In some applications of regression modeling the goal is simply to achieve the best possible predictions of future response values. In other applications, interpretation is important as a way to guide understanding of the process under investigation. Ridge regression is very good at prediction, although is often eclipsed by the lasso in terms of both prediction and interpretation because the lasso also allows for selection. The method introduced in this talk, Fractional Ridge Regression, has the potential to improve both prediction, as measured by mean square error, and interpretability, as measured by specificity of variable selection, relative to the lasso.