

ASYMPTOTIC DEGREES OF FREEDOM FOR COMBINING REGRESSION WITH FACTOR ANALYSIS

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In multivariate regression problems with multiple responses, there often exist unobserved covariates (features) which are correlated with the responses. It is possible to estimate these covariates via factor analytic (eigenvector) methods, but calculating unbiased error variance estimates after adjusting for latent factors requires assigning appropriate degrees of freedom to the estimated factors. Many ad-hoc solutions to this problem have been proposed without the backup of a careful theoretical analysis. Using recent results from random matrix theory, we derive an expression for degrees of freedom. Our estimate gives a principled alternative to ad-hoc approaches in common use. Extensive simulation results show excellent agreement between the proposed estimator and its theoretical value.

Joint work with Natesh Pillai (Harvard University, USA).