open journal systems

Admissible, consistent multiple testing with applications including variable selection

Chuanwen Chen, *Rutgers University* Arthur Cohen, *Rutgers University* Harold B. Sackrowitz, *Rutgers University*

Abstract

For multivariate normal models and some exponential family models a multiple testing stepwise method is offered that is both admissible and consistent. The method is readily adaptable to selecting variables in linear regression models where it is akin to the forward selection method plus a screening stage plus a sign compatibility stage.

AMS 2000 subject classifications: Primary 62F03; secondary 62C15, 62J05.

Keywords: backward method, exponential family, forward method, linear regression, step-down procedures, step-up procedures, variable selection.



Full Text: PDF

Chen, Chuanwen, Cohen, Arthur, Sackrowitz, Harold B., Admissible, consistent multiple testing with applications including variable selection, Electronic Journal of Statistics, 3, (2009), 633-650 (electronic). DOI: 10.1214/09-EJS391.

References

An, H. and Gu, L. (1985). On the selection of regression variables. Acta Mathematicae Applicatae Sinica 2, 27–36.

Benjamini, Y. and Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. Journal of the Royal Statistical Society, Ser. B 57, 289–289. MR1325392

Bunea, F., Wegkamp, M.H., and Auguste, A. (2006). Consistent variable selection in high dimensional regression via multiple testing. Journal of Statistical Planning and Inference 136, 12, 4349–4364. MR2323420

Chen, C., Cohen, A., and Sackrowitz, H.B. (2009). Multiple testing in ordinal data models. Submitted.

Christensen, R. (1987). Plane Answers to Complex Questions: The Theory of Linear Models. Springer. MR0897102

Cohen, A. and Sackrowitz, H.B. (2005a). Decision theory results for one-sided multiple comparison procedures. The Annals of Statistics 33, 1, 126–144. MR2157798

Cohen, A. and Sackrowitz, H.B. (2005b). Characterization of Bayes procedures for multiple endpoint problems and inadmissibility of the step-up procedure. The Annals of Statistics 33, 1, 145–158. MR2157799

Cohen, A. and Sackrowitz, H.B. (2007). More on the inadmissibility of step-up. Journal of Multivariate Analysis 98, 3, 481–492. MR2293009

Cohen, A. and Sackrowitz, H.B. (2008). Multiple testing to two-sided alternatives with dependent data. Statistica Sinica 18, 1593–1602. MR2469325

Cohen, A., Kolassa, J., and Sackrowitz, H.B. (2007). A smooth version of the step-up procedure for multiple tests of hypotheses. Journal of Statistical Planning and Inference 137, 11, 3352–3360. MR2363261

Cohen, A., Sackrowitz, H.B., and Xu, M. (2009). A new multiple testing method in the dependent case. The Annals of Statistics 37.

Dudoit, S. and Van Der Laan, M.J. (2008). Multiple Testing Procedures with Applications to Genomics. Springer Verlag. <u>MR2373771</u>

Johnson, N.L. and Kotz, S. (1970). Continuous univariate distributions-2. Houghton Mifflin.

Lehmann, E.L. and Romano, J.P. (2005). Testing Statistical Hypotheses, Third ed. Springer. <u>MR2135927</u>

Matthes, T.K. and Truax, D.R. (1967). Tests of composite hypotheses for the multivariate exponential family. The Annals of Mathematical Statistics 38, 681–697. MR0208745

Miller, A. (2002). Subset Selection in Regression, Second ed. Chapman and Hall/CRC. MR2001193

Home | Current | Past volumes | About | Login | Notify | Contact | Search

Electronic Journal of Statistics. ISSN: 1935-7524