

This paper considers hypothesis testing problems for a low-dimensional coefficient vector in a high-dimensional linear model with heteroscedastic variance. Heteroscedasticity is a commonly observed phenomenon in many applications including finance and genomic studies. Several statistical inference procedures have been proposed for low-dimensional coefficients in a high-dimensional linear model with homoscedastic variance. However, existing procedures designed for homoscedastic variance are not applicable for models with heteroscedastic variance and the heteroscedasticity issue has been rarely investigated and studied. We propose a simple inference procedure based on empirical likelihood to overcome the heteroscedasticity issue. The proposed method is able to make valid inference even when the conditional variance of random error is an unknown function of high-dimensional predictors. We apply our inference procedure to three recently proposed estimating equations and establish the asymptotic distributions of the proposed methods. Simulation studies and real data analyses are conducted to demonstrate the proposed methods.