Nonparametric Matching and Efficient Estimators of Homothetically Separable Functions

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Abstract

For vectors \( x \) and \( w \), let \( r(x, w) \) be a function that can be nonparametrically estimated consistently and asymptotically normally. We provide consistent, asymptotically normal estimators for the functions \( g \) and \( h \), where \( r(x, w) = h[g(x), w] \). \( g \) is linearly homogeneous and \( h \) is monotonic in \( g \). This framework encompasses homothetic and homothetically separable functions. Such models reduce the curse of dimensionality, provide a natural generalization of linear index models, and are widely used in utility, production, and cost function applications. One of our estimator’s of \( g \) is oracle efficient, achieving the same performance as an estimator based on local least squares knowing \( h \). We provide simulation evidence on the small sample performance of our estimators, and an empirical production function application.

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