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Estimation in autoregressive model with measurement error

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Consider an autoregressive model with measurement error: we observe $Z_i=X_i+\epsilon_i$, where X_i is a stationary solution of the equation $X_i=f_{\theta^0}(X_{i-1})+\xi_i$. The regression function f_{θ^0} is known up to a finite dimensional parameter θ^0. The distributions of X_0 and ξ_1 are unknown whereas the distribution of ϵ_1 is completely known. We want to estimate the parameter θ^0 by using the observations $Z_0,..,Z_n$. We propose an estimation procedure based on a modified least square criterion involving a weight function w, to be suitably chosen. We give upper bounds for the risk of the estimator, which depend on the smoothness of the errors density f_ϵ and on the smoothness properties of $w f_\theta$.

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