Invariance Principle for Generalized Quantiles under Dependence

Martin Wendler*

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One- and two-sample empirical U-quantiles are applied in robust estimation and robust change point detection. We will give a strong invariance principle (almost sure approximation by a Kiefer-Müller process) for the empirical one-sample U-process (the empirical process of the values $h(X_i, X_i)$ for a bivariate, symmetric function h). With the help of a generalized Bahadur representation, it follows that such a strong invariance principle also holds for the empirical U-quantile process and consequently for GL-statistics (linear combination of U-quantiles). Furthermore, we will give a weak invariance principle for two-sample U-statistics and U-quantiles.

*Ruhr-Universität Bochum, Martin.Wendler@rub.de