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Machine Learning for 5G Parameter Estimation based on Real Channel Measurements

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Hörsaal H6, Cauerstraße 7/9

We present a numerically efficient method for estimating M-dimensional structured channels that uses techniques from the field of machine learning. The considered channel model assumes channel vectors which are normally distributed given an unknown(!) covariance matrix. The latter depends on random hyper-parameters that are typically related to geometrical properties of the environment. If the channel model exhibits specific structures, the numerical complexity for computing a true MMSE estimator can be reduced to O(M log M); otherwise, it is much higher. To obtain an equally low-complex estimator for the general case of the considered channel model, the structure of the specific MMSE estimator is used as an informed guess for the architecture of a neural network. We discuss how this network can be efficiently trained with channel realizations to learn the MMSE estimator within the class of O(M log M) estimators. New results based on real channel measurements of a recently conducted field trial demonstrate the applicability of the proposed method in real-world applications.