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STATISTICAL CHARACTERIZATIONS OF GAUSSIAN MEASURES ON A HILBERT SPACE

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Abstract: Let $X_1, ..., X_n$ be i.i.d. random vectors with values in a real separable Hilbert space. We consider the problem of estimating the mean of X_1 under quadratic loss and discuss analogues of characteristic properties of normally distributed real random variables. It is shown that there exists an equivariant sufficient linear statistic iff X_1 is Gaussian. Further the optimality of the sample mean $\bar{X}$ in the class of all equivariant or unbiased estimators is a characteristic property of Gaussian random vectors.

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