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# Tensor Product Kernels: Characteristic Property and Beyond\*

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## Abstract

Maximum mean discrepancy (MMD) and Hilbert-Schmidt independence criterion (HSIC) are among the most popular and successful approaches in data science to measure the difference and the independence of random variables, respectively. Thanks to their kernel-based roots, MMD and HSIC are applicable on a large variety of domains; examples include documents, images, trees, graphs, time series, dynamical systems, sets or permutations. Despite their tremendous practical success, quite little is known about when HSIC characterizes independence and MMD with tensor kernel can discriminate probability distributions, in terms of the contributing kernel components. In this presentation, I am going to provide a complete answer to this question, with conditions which are often easy to check in practice.

- Preprint: <https://arxiv.org/abs/1708.08157>

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\*Advanced Methods Group, Cubist Systematic Strategies, New York, 28 November 2017; abstract.

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