

Hilbert Spaces Associated With Conditionally Positive Definite Functions

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Positive definite and conditionally positive definite kernels represent fundamental building blocks for several methods of applied mathematics with the aim to infer functional dependencies from scattered data. Much of the strength of such approaches is coming from an underlying reproducing kernel Hilbert space. While on \mathbb{R}^d those spaces are well understood, the situation changes for more abstract domains. Nevertheless, other domains are of growing importance for many applications.

We will present the basic concepts from a kernel perspective. Focusing then on the notion of conditionally positive definite kernels, we ask for the analog of the reproducing kernel Hilbert space in the generalized situation, leading to the notion of reproducing kernel Pontryagin spaces.