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**on Approximation**

# Pasting reproducing kernel Hilbert spaces<sup>†</sup>

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## Abstract

In the present paper, two new operation on reproducing kernel Hilbert spaces are proposed. One is the pasting and another is the wedge product. As applications of these operations, we reconsider the Cauchy-Binet formula.

**Keywords:** reproducing kernel Hilbert spaces, Cauchy-Binet formula.

**MSC:** Primary 47B32; Secondary 46E22.

## §1. Introduction

The purpose of this short paper is to propose new operations for reproducing kernel Hilbert spaces and to reconsider the Cauchy-Binet formula in terms of reproducing kernel Hilbert spaces.

Aronszajn investigated reproducing kernel Hilbert spaces in his celebrated paper [1]. By the reproducing kernel Hilbert space, we mean a Hilbert space  $H$  over a field  $\mathbb{K}$  of the functions on a set  $E$ , where  $\mathbb{K}$  denotes  $\mathbb{R}$  or  $\mathbb{C}$ , such that the evaluation mapping  $f \in H \mapsto f(x) \in \mathbb{K}$  is continuous for all  $x \in E$ . By the Riesz representation theorem, such a function space carries the function  $K : E \times E \rightarrow \mathbb{K}$  so that  $K(\cdot, x) \in H$  and that  $f(x) = \langle f, K(\cdot, x) \rangle_H$ . For further properties of the reproducing kernel Hilbert space  $H_K$ , we refer to [2].

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