Mohammed Mouattamid (mouattam@ualberta.ca) Campus Saint-Jean, University of Alberta, Alberta, T6C 4G9, Canada, ***Orthogonal Decomposition of the Reproducing Hilbert Space for a Conditionally Positive Definite Function Using Theory of the Power Kernels.***

ABSTRACT. The main topic of this talk concerned the properties and the construction of reproducing kernels of Hilbert spaces (RKHS) and their natives spaces. This paper had three main objectives. The First is translating the problem of interpolation into a system written in terms of the Lagrange basis vector and a complementary vector of functions. This was done using interplant and polynomials, which describe the standard setting of interpolation problems using conditionally positive definite kernels. The second is proving how any given conditionally positive kernel Φ defines a Native Hilbert space of functions in which it is reproducing, but depending on polynomials. This allows us to define the normalized kernel. In order to eliminate this dependence of polynomials, we define an unconditionally positive definite kernel K_X, called power kernel of any scattered data X. We will show that this power kernel allows recursive interpolation, by decomposing large interpolation problems into smaller ones. These new kernels must have native Hilbert spaces. We also proved how those are related to the native Hilbert space of the original kernel. It turned out that there is an orthogonal decomposition of the original native Hilbert space (interpolation by f), involving the native space of the power kernel (interpolation by K_X). This paper also involved the construction of power kernels and their native Hilbert spaces.