

**From Whittaker-Shannon-Kotel'nikov theorem
to shift-invariant and U -invariant sampling**

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The classical Whittaker-Shannon-Kotel'nikov theorem states that any function with compact supported Fourier transform is completely determined by its ordinates at a series of equally spaced points. This revolutionary result has had an enormous impact due to its applications in many many branches of applied mathematics. Nowadays signals are assumed to belong to some shift-invariant subspace of $L^2(\mathbb{R})$, besides, in many common situations the available data of a signal are samples of some filtered versions of the signal itself. This leads to the problem of generalized sampling in shift-invariant spaces, i.e., to recover any function in this subspaces by means of its samples. A more general problem is to consider subspaces of a Hilbert space generated by an unitary operator U . The goal of this work is to give a survey on the history of the WSK theorem and conclude with some results in shift-invariant and U -invariant sampling.