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Akram Aldroubi* (akram.aldroubi@vanderbilt.edu). *Perfect reconstruction of signals from series of under sampled states.*

Let f an initial state of a dynamical process controlled by an operator A that produces the states Af, A^2f, \dots at times $t = 1, 2, \dots$. Let M be a measurement operator applied to the series Af, A^2f, \dots at times $t = 1, 2, \dots$. The problem is to recover f from the measurements $Y = \{Mf, MAf, MA^2f, \dots, MA^L f\}$. This is the so called Dynamical Sampling Problem. A prototypical example is when $f \in \ell^2(\mathbb{Z})$, X a proper subset of \mathbb{Z} and $Y = \{f(X), Af(X), A^2f(X), \dots, A^L f(X)\}$. The problem is to find conditions on A , X , L , that are sufficient for the recovery of f . We will discuss the problem, its applications, and some of the recent results obtained in collaboration with Roza Aceska, Carlos Cabrelli, Jacqueline Davis, Ilya Krishtal, Ursula Molter, Armenak Petrosyan, and Sui Tang. (Received September 14, 2013)