

1145-41-2795 **Anna Aboud*** (acseitz@iastate.edu). *A Dual Kaczmarz Algorithm*. Preliminary report.

The Kaczmarz algorithm is an iterative method for solving a system of linear equations. It can be extended so as to reconstruct a vector x in a (separable) Hilbert space from the inner-products $\langle x, \phi_n \rangle$. This extension uses the sequence $\{\phi_n\}$ in the reconstruction from the sequence $\langle x, \phi_n \rangle$, but only succeeds when the sequence is *effective*. We dualize the Kaczmarz algorithm so that the reconstruction of x can be obtained from $\langle x, \phi_n \rangle$ by using a second sequence $\{\psi_n\}$ in the reconstruction. This allows for the reconstruction of x even when the sequence $\{\phi_n\}$ is not effective; in particular, our dualization yields a reconstruction when the sequence $\{\phi_n\}$ is *almost effective*. We also obtain some partial results characterizing when the reconstruction of x from $\langle x, \phi_n \rangle$ using $\{\psi_n\}$ succeeds, which we call an *effective pair*. (Received September 25, 2018)