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Qin Li*, qinli@math.wisc.edu, and **Leonardo Zepeda-Nunez, Tan Bui, Steve Wright and Ke Chen.** *Inversion with incomplete data – a case study of matrix sketching and matrix completion.*

Theoretical inverse problem studies typically reconstruct a function, an infinite dimensional object, using the full input-to-output map, an infinite amount of data. This is not feasible either numerically nor practically. It is expected that the theory on the wellposedness can be useful in the justification of the numerical algorithm, but many challenges remain: how many data points are needed for reconstructing a d dimensional unknown? Where should these data points be collected?

We study these problems with a machine learning perspective. In particular, we investigate the application of matrix sketching and matrix completion, and bridge the information provided by finite and infinite-sized dataset. These algorithms place us back to the infinite-dimension setting, making the application of the theory possible. (Received August 18, 2021)