Phase retrieval in Banach lattices

Daniel Freeman

Saint Louis University

We consider the equivalence relation on a Banach space X by x ax for any scalar |a|=1. We say that a linear operator T from a Banach space X into a Banach lattice E does phase retrieval if the non-linear map [x]->|Tx| is a one-to-one function from the quotient space X/ into E. That is, a linear operator does phase retrieval if it is possible to recover any vector, up to equivalence, from only the absolute value of the linear measurements. This problem arises in many applications, such as x-ray crystallography and audio processing. We present this is a problem about the non-linear geometry of Banach spaces, and show connections to the classical theory of Banach lattices.This is joint work with Benjamin Pineau, Timur Oikhberg, and Mitchell Taylor

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