STABLE PHASE RETRIEVAL IN FUNCTION SPACES

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Let (Ω, Σ, μ) be a measure space, and $1 \leq p \leq \infty$. A subspace $E \subseteq L_p(\mu)$ is said to do *stable phase retrieval (SPR)* if there exists a constant $C \geq 1$ such that for any $f, g \in E$ we have

$$(0.1) \qquad \inf_{|\lambda|=1} \|f - \lambda g\| \leq C \||f| - |g|\|.$$

In this case, if $|f|$ is known, then f is uniquely determined up to an unavoidable global phase factor λ; moreover, the phase recovery map is C-Lipschitz. Phase retrieval appears in several applied circumstances, ranging from crystallography to quantum mechanics.

In this talk, I will present some elementary examples of subspaces of $L_p(\mu)$ which do stable phase retrieval, and discuss the structure of this class of subspaces. This is based on a joint work with M. Christ and B. Pineau as well as a joint work with D. Freeman, T. Oikhberg and B. Pineau.

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