

# Semidefinite programming bounds for distance-avoiding set problems on compact spaces

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Witsenhausen's problem asks for the maximum fraction  $\alpha_n$  of an  $n$ -dimensional unit sphere that can be covered by a measurable set containing no pairs of orthogonal points. We extend optimization hierarchies based on the Lovász theta number, like the Lasserre hierarchy, to Witsenhausen's problem and similar problems. Essential for implementation is the use of harmonic analysis on the sphere to reduce the size of the programs significantly. We obtained the best upper bounds known for  $\alpha_n$  in low dimensions.