Density matrices arising from incomplete measurements,

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Abstract

In this paper, the following problem is considered: given two Hermitian matrices H and K and two real numbers x and y, determine a positive semidefinite matrix ρ such that the von Neumann entropy $-\mathrm{Tr}\rho\log\rho$ is maximum, subject to the condition that $\mathrm{Tr}\rho H = x$ and $\mathrm{Tr}\rho K = y$. This question arises in information theory and in statistical mechanics in connection with the maximum-entropy inference principle. To answer it, we use this principle and numerical range methods.

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