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*Some extremal properties of quantum probability measures*

A quantum probability measure is a positive operator-valued measure (POVM) whose value on the entire sample space is the identity operator acting on a Hilbert space  $H$ . In the event that  $H$  is 1-dimensional, then a quantum probability measure is simply a probability measure in the classical sense. Optimality questions are often linked to the issues of optimisation on a convex set, in which case knowledge of the extreme points of the convex set becomes important. In this lecture, I will discuss the structure of extreme points and  $C^*$ -extreme points in the space of quantum probability measures, and explain how quantum probability measures that satisfy a certain norm-theoretic optimality condition are related to the  $C^*$ -extreme points. In connection with this latter result, the role of operator systems in the analysis of quantum probability measures will be explained. This lecture is drawn from collaborative work with R. Floricel, S. Plosker, and J. Smith.