

INSTRUMENTS AND MUTUAL ENTROPIES IN QUANTUM INFORMATION

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Abstract. General quantum measurements are represented by instruments. In this paper the mathematical formalization is given of the idea that an instrument is a channel which accepts a quantum state as input and produces a probability and an a posteriori state as output. Then, by using mutual entropies on von Neumann algebras and the identification of instruments and channels, many old and new informational inequalities are obtained in a unified manner. Such inequalities involve various quantities which characterize the performances of the instrument under study; in particular, these inequalities include and generalize the famous Holevo's bound.
