

On the properties $\alpha - z$ Rényi divergences on general von Neumann algebras

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1 Introduction

2 Preliminaries

2.1 Basic definitions

Let \mathcal{M} be a von Neumann algebra and let \mathcal{M}_* be its predual. We will denote the cone of positive operators in \mathcal{M} by \mathcal{M}^+ , similarly, \mathcal{M}_*^+ will denote the cone of positive normal linear functionals on \mathcal{M} .

Haagerup L_p spaces

Kosaki, complex interpolation. Generalized s-numbers. Haagerup reduction.

2.2 The $\alpha - z$ -Rényi divergences

In [?], the $\alpha - z$ -Rényi divergence for $\psi, \varphi \in \mathcal{M}_*^+$ was defined as follows:

The following variational formulas will be an important tool for our work.

Theorem 1. (i) $\alpha < 1$, + attained

(ii) $\alpha > 1$

Proof. [?] for (i).

□

3 Data processing inequality and reversibility of quantum channels