

APPROXIMATE TENSORIZATION OF THE RELATIVE ENTROPY FOR NONCOMMUTING CONDITIONAL EXPECTATIONS

Ivan Bardet, INRIA Paris

Ángela Capel, Technische Universität München, MCQST

Cambyse Rouzé, Technische Universität München, MCQST



STRONG SUBADDITIVITY OF VON NEUMANN ENTROPY

$$S(\rho_{ABC}) + S(\rho_B) \leq S(\rho_{AB}) + S(\rho_{BC})$$

[1]



APPROXIMATE TENSORIZATION OF THE RELATIVE ENTROPY

$$D(\rho || E_*^M(\rho)) \leq c \left(D(\rho || E_*^1(\rho)) + D(\rho || E_*^2(\rho)) \right) + d$$

[2]



MODIFIED LOGARITHMIC SOBOLEV INEQUALITY (MLSI)

$$4 D(\rho || \sigma) \leq -\text{Tr}[L_*(\rho)(\log \rho - \log \sigma)]$$

APPLICATIONS

RAPID MIXING

HYPOTHESIS TESTING

QUANTUM ANNEALERS

GIBBS STATE PREPARATION

[1] I. Bardet, Á. Capel and C. Rouzé, *Approximate tensorization of the relative entropy for noncommuting conditional expectations*, arXiv:2001.07981.

[2] Á. Capel, C. Rouzé and D. Stilck França, *The modified logarithmic Sobolev inequality for quantum spin systems: classical and commuting nearest neighbour interactions*, arXiv:2009.11817.