Notes on erasing maps

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1 Analysis of entanglement distribution of JAs channels

Here we analyze the fidelity distribution of one element on each class, since they are connected trivially through local unitaries, it is enough to consider one element per class.

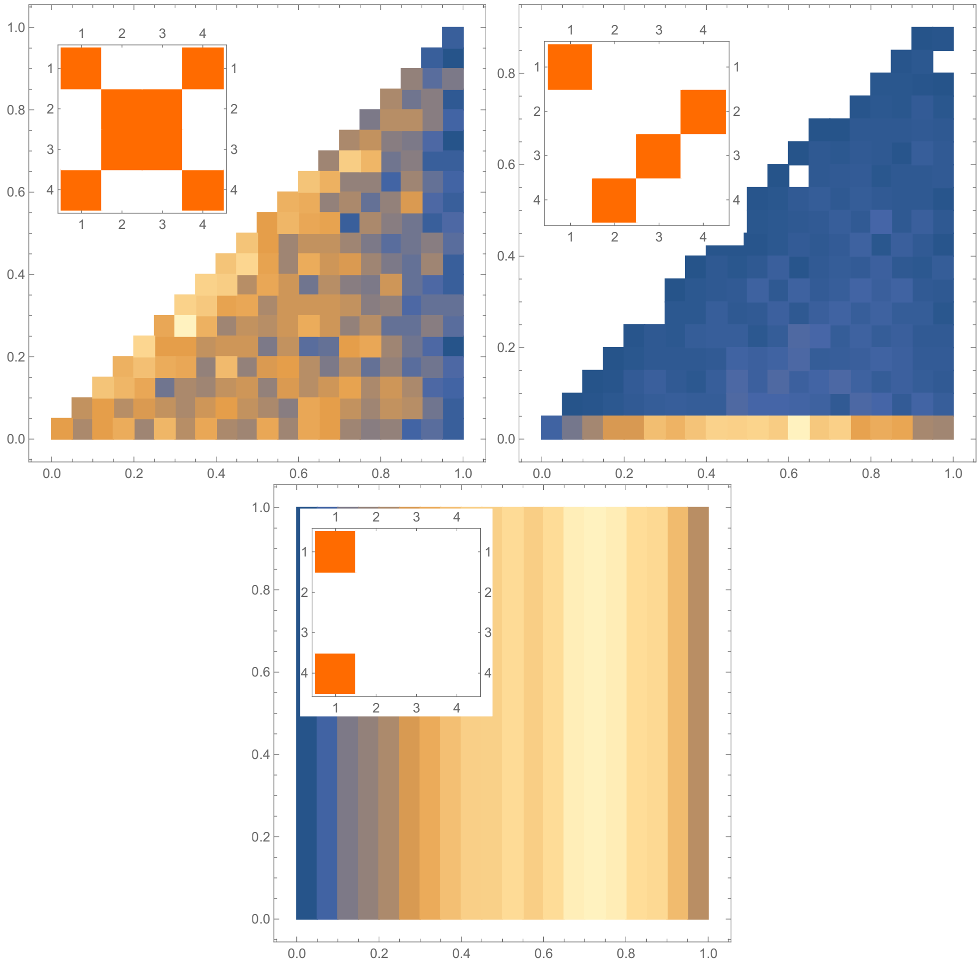

Figure 1: eje x: concurrencia inicial, eje y: concurrencia final, tomando estados aleatorios.

2 Erasing correlations plus local? noise

Let's define the mappings parameterized by μ:

$$\mathcal{E} : \sum_{i,j} r_{ij}(\sigma_i \otimes \sigma_j) \mapsto \sum_{i>0} \mu r_{i0}(\sigma_i \otimes \mathbb{1}) + \sum_{i>0} \mu r_{0i}(\mathbb{1} \otimes \sigma_i) + r_{00}\mathbb{1} \otimes \mathbb{1} \tag{1}$$

We found that such mappings are CPTP if and only if

$$-\frac{1}{6} \leq \mu \leq \frac{1}{2}. \tag{2}$$

Defining similar maps for 3 and 4 particles respectively, we have:

$$-\frac{1}{36} \leq \mu \leq \frac{1}{4}, \tag{3}$$

$$-\frac{1}{174} \leq \mu \leq \frac{1}{10} \tag{4}$$

$$\tag{5}$$

The last one doesn't follow the elegance of the growing dimension, this must be checked again. All this was computed analytically using mathematica.

3 Exploring and writing the former maps

Consider the map

$$\rho \mapsto (1-\mu)\,\mathrm{tr}_B\,\rho \otimes \sigma_1 + \mu\sigma_2 \otimes \mathrm{tr}_A\,\rho, \tag{6}$$

Taking $\sigma_1 = \sigma_2 = \mathbb{1}_{2\times 2}/2$, we have that the map takes $\vec{r}$ to:

$$\begin{pmatrix} r_{0,0} & \mu r_{0,1} & \mu r_{0,2} & \mu r_{0,3} \\ (1-\mu) r_{1,0} & 0 & 0 & 0 \\ (1-\mu) r_{2,0} & 0 & 0 & 0 \\ (1-\mu) r_{3,0} & 0 & 0 & 0 \end{pmatrix} \tag{7}$$