1. (A) For a classical bit channel with bit flip error probability p, it is clear that at $p = \frac{1}{2}$. We deomonstrate this by making the abstraction black-white pixel $\sim$ bit and passing each through a channel with the the desired statistical properties with varying levels of redundancy (duplications of each bit).

   (B) The case where we consider a quantum channel with classical information is nontrivial. In our project we attempted to implement the channel description of the paper *Quasi-Superactivation of Classical Capacity of Zero-Capacity Quantum Channels- Laszlo Gyongyosi, Sandor Imre* `https://arxiv.org/abs/1206.5693`. We seek to verify the claims of this paper by explicitly constructing the described channel:

Figure 1: Left side depics the quantum channel $\mathcal{M} = \mathcal{N}_1 \circ \mathcal{N}_2$ where $\mathcal{N}$ is any quantum channel that outputs a maximally mixed state and $\mathcal{N}$ is a $1 \rightarrow 2$ cloning channel (further details with simulated emission), also $F = \frac{2}{3} + \frac{1}{3N}$ where $F = \langle\psi|\, \rho\, |\psi\rangle$.

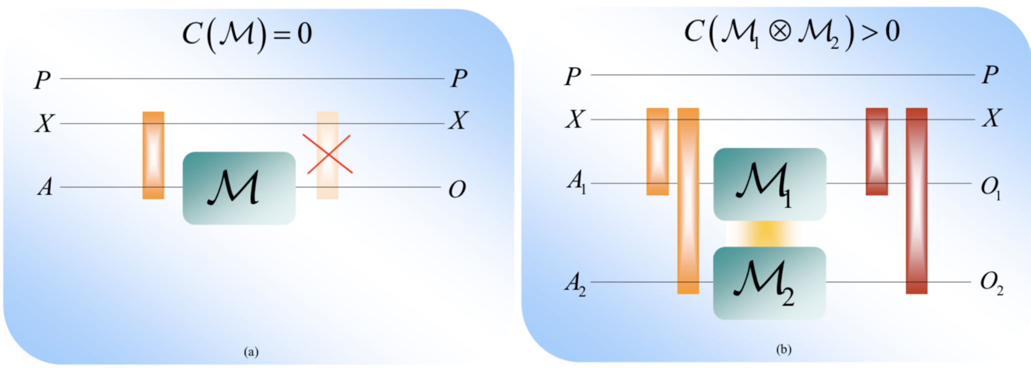

Figure 2: As a single channel, this has zero classsical information capacity. Which we test. But, when combining two channels with entangled inputs into the channel $\mathcal{N}_2$, we get non-zero channel capacity.

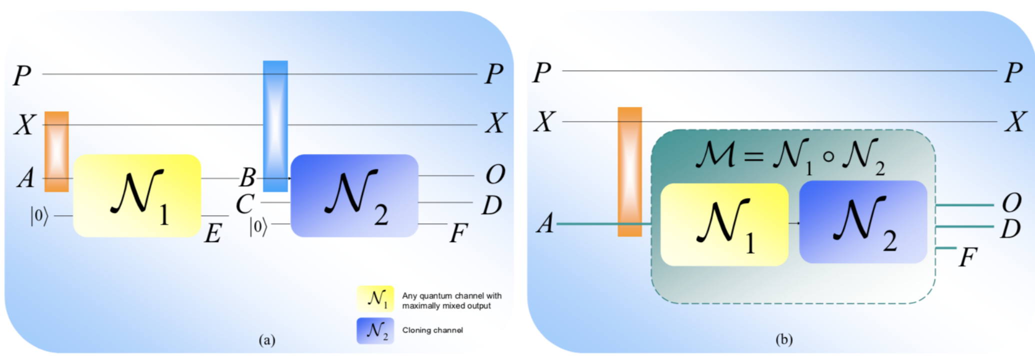

Figure 3: Plot of the product channel capacity as a function of the correlation coefficient Ω. When the entaglement coefficient is $\frac{1}{2}$, (so the entangled states input is) $\frac{1}{\sqrt{2}}(|0,0\rangle + |11\rangle)$. Then there is no quantum correlation that is able to pass through the network and all information is lost.

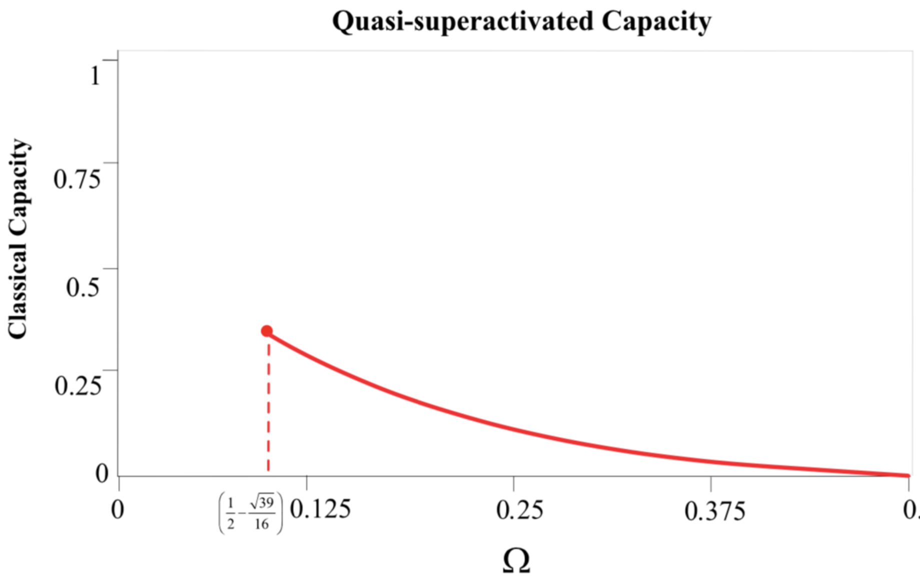

Figure 4: Plot of expirementally determined classical channel capacity vs. correlation coefficient Ω. We see the range $\Omega \in [1/8, 1/2]$ is relevant. As was discussed in the paper.