

## COMP 760 - Assignment 4 - Due: Mar 30th.

You are allowed to collaborate in solving these questions, but each person should write and submit her own solution.

1. Suppose that  $f : \{0, 1\}^n \times \{0, 1\}^n \rightarrow \{0, 1\}$  satisfies  $f(x, y) = f(y, x)$  for all  $x$  and  $y$ . Show that the measure  $\mu$  that achieves the maximum of  $\text{IC}_\mu(f)$  also satisfies  $\mu(x, y) = \mu(y, x)$ .
2. Adopt the Braverman-Rao compression to the setting of the external information cost. However, in this case your compression must not introduce any error.
3. Use the previous question to show that

$$\lim_{n \rightarrow \infty} \frac{\text{CC}_{\mu^n}(f^n)}{n} \leq I_\mu^{\text{ext}}(f).$$