Exercise 1: Let $\mathcal{C} \subseteq \mathbb{R}^{m\times m}$ be the set of matrices C for which there are random variables $A_x, B_y : \Omega \to \{-1,1\}$ and a probability measure P such that

$$C_{xy} = \int_\Omega A_x(\omega)B_y(\omega)\,\mathrm{d}P(\omega)$$

1. Show that $\mathcal{C}$ is a closed, convex polytope.
2. Let $\mathcal{C}' \subseteq \mathbb{R}^{m\times m}$ be a similarly defined set for which the random variables are allowed to have ranges in $[-1,1]$ rather than only $\{-1,1\}$. Prove that $\mathcal{C}' = \mathcal{C}$.

Exercise 2: Consider a setup of three parties (Alice, Bob and Charly), each of which has two ±1-valued measurement devices at hand, which we label by P_i, where the $P \in \{A(lice), B(ob), C(harly)\}$ stands for the party and the $i \in \{1,2\}$ for the chosen device. For

$$\langle A_1B_1C_2\rangle + \langle A_1B_2C_1\rangle + \langle A_2B_1C_1\rangle - \langle A_2B_2C_2\rangle$$

quantum theory allows a value up to 4. What is the maximum value consistent with a LHV theory (generalized to three parties)?