Quiz 6: Distance Measures

Question 1. What is the fidelity between the maximally mixed state and a pure state in a system of dimension d?

(a) 1.

(b) $\frac{1}{d}$.

(c) $\frac{1}{\sqrt{d}}$.

(d) 0.

Question 2. What is the optimal success probability with which we can distinguish between the states

$$\rho_{AB} = \frac{1}{2}(|00\rangle + |11\rangle)(\langle 00| + \langle 11|), \quad \sigma_{AB} = \frac{1}{2}(|00\rangle\langle 00| + |11\rangle\langle 11|),$$

assuming we are given one of them uniformly at random?

(a) $\frac{1}{2}$.

(b) $\frac{1}{2} + \frac{1}{2\sqrt{2}}$.

(c) $\frac{3}{\sqrt{4}}$.

(d) 1.

Question 3. What is the optimal success probability in the previous question if we are now only allowed to make a measurement on the A system?

(a) $\frac{1}{2}$.

(b) $\frac{1}{2} + \frac{1}{2\sqrt{2}}$.

(c) $\frac{3}{\sqrt{4}}$.

(d) 1.