Week assignment 08 (Homework vault part)

Deadline: 09. 12. 2020

Upload scan, photograph, or a typesetted pdf of computation to the corresponding homework vault. Do not forget to include your name and personal ID number (učo) on the page(s).

Exercise 1. [1pt] Determine the probabilities with which Bob measures 0 and 1 and in both cases describe the conditional state of Alice. Their joint state is

$$|\psi\rangle_{AB} = \frac{1}{\sqrt{6}} \left(|00\rangle_{AB} + \sqrt{2} \, |01\rangle_{AB} - i\sqrt{3} \, |10\rangle_{AB} \right).$$

Exercise 2. [2pts] Using the ABC method find decomposition for a controlled U operation, where

$$U = \frac{1}{\sqrt{2}} \begin{pmatrix} i & 1 \\ 1 & i \end{pmatrix}$$

Exercise 3. [3pts] Let us have matrix

$$A = \frac{1}{2} \begin{pmatrix} -1 & -i\sqrt{3} \\ i\sqrt{3} & 1 \end{pmatrix}.$$

Find its egenvalues and corresponding eigenvectors and decide whether the matrix is unitary, Hermitian, positive semi-definite, and/or a projection.