

# Indian Institute of Science

## Quantum Information Theory

Instructor: Shayan Srinivasa Garani

Homework #2, Fall 2022

Late submission policy: Points scored = Correct points scored  $\times e^{-d}$ ,  $d = \#$  days late

**Assigned date:** Sep. 23<sup>rd</sup>, 2022

**Due date:** Oct. 4<sup>th</sup>, 2022, 11:59 pm

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PROBLEM 1: Solve the following exercise problems from Mark Wilde's book: 4.1.8, 4.2.2, 4.4.7, 4.4.10, 4.4.11, 4.4.13. (25 pts.)

PROBLEM 2: Derive the Kraus operators for the following: (a) quantum erasure channel over qubits and (b) generalized quantum dephasing channel over a  $d$ -dimensional Hilbert space. (10 pts.)

PROBLEM 3: Solve the following exercise problems from Nielsen and Chuang's book: 8.21, 8.23. (15 pts.)