Open Quantum systems and quantum thermodynamics - Assignment

November 2024

Full Marks: 50

1. a) Define depolarising quantum channel and find its fixed point (State that does not change under the evolution). b) Construct the Kraus operators for qubit depolarising channel. c) Construct the Lindblad type master equation for qubit depolarising channel. (5+10+15)

2. Consider the following qubit operation

$$\rho_{11}(t) = \rho_{11}(0)\exp(-\gamma t), \quad \rho_{12}(t) = \rho_{12}(0)\exp(-2\gamma t).$$

The notations has their usual meaning (predict the other terms). Show whether it is invertible or not. (10)

3. Construct the "F"-matrix and "L"-matrix for generalised amplitude damping channel for a qubit.

(10)