Title:	Complete positivity in the presence of system-environment correlations: Bayesian inference and Markovianity
Authors:	Sareen, Ritik
Keywords:	system-environment correlations Bayesian inference
Issue Date:	May-2023
Publisher:	IISER Mohali
Abstract:	Understanding the dynamics of a quantum system is one of the most fundamental re- quirements for any experiment. Isolated systems undergo unitary evolution while the evo- lution of open systems can be mapped by adding an ancilla and applying a global unitary. However, the reduced dynamics of the system when it is correlated with the environment can show non-completely positive (non-CP) behaviour. The map describing the dynam- ics is not well defined in such cases. This has been the topic of study for more than two decades now. In this thesis, we will first understand the reasoning behind the observation of this phenomenon in classical systems given by Spekkens et al. [Schmid 19] using causal models. They also go on to define an evolution map which differs from the one considered under the standard proposal. In this thesis work, we extend their arguments for quantum systems and try to define an evolution map which conforms to the general standard of input-output relation by apply- ing bayesian inference using star operation. This evolution map is defined on a restricted domain, but takes into account the whole causal structure instead of discarding certain re- lations as done by in the previously proposed evolution map [Schmid 19]. This evolution map completely defines the reduced dynamics of the system even when it is correlated with the environment, which can increase our understanding of open systems.
Description:	embargo period Embargo Period
URI:	http://hdl.handle.net/123456789/5536
Appears in Collections:	MS-18

Files in This Item:

File	Description	Size	Format	
Need To Add…Full Text_PDF		15.36 kB	Unknown	View/Open

Show full item record