Geometric description of quantum states: Markovian dynamics and control of open quantum systems

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Differential geometry allows us to analyse the underlying structures in the space of pure and mixed states of quantum systems. I will describe the geometric objects that arise naturally from the properties of quantum systems, namely a Poisson and a symmetric tensor field which define a specific stratification of the manifold of states. This geometric structure is a powerful framework for the study of dissipation, Markovian dynamics, decoherence and optimal control problems in open quantum systems.

References

[1] J. F. Cariñena, J. Clemente-Gallardo, J. A. Jover-Galtier, G. Marmo (2017). Tensorial dynamics on the space of quantum states. *Journal of Physics A: Mathematical and Theoretical* 50, 365301.

[2] J. A. Jover-Galtier (2017). Open quantum systems: geometric description, dynamics and control. PhD Thesis, supervisors: J. F. Cariñena, J. Clemente-Gallardo. Universidad de Zaragoza.

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