



## Mathematics and CS Seminar

# On the existence of derivations as square roots of generators of state-symmetric quantum Markov semigroups

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Host: Jan Maas / Haonan Zhang

Cipriani and Sauvageot have shown that for any generator  $L$  of a tracially symmetric quantum Markov semigroup on a  $C^*$ -algebra  $A$  there exists a densely defined derivation  $\delta$  from  $A$  to a Hilbert bimodule  $H$  such that  $L = \delta^*\delta$ . Here we show that this construction of a derivation can in general not be generalised to quantum Markov semigroups that are symmetric with respect to a non-tracial state. In particular we show that all derivations to Hilbert bimodules can be assumed to have a concrete form, and then we use this form to show that in the finite-dimensional case the existence of such a derivation is equivalent to the existence of a positive matrix solution of a system of linear equations. We solve this system of linear equations for concrete examples using Mathematica to complete the proof.

**Thursday, March 31, 2022 05:15pm - 06:15pm**

Mondi 2 (I01.01.008), Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.