We clarify the meaning of diagonalizability of quantum Markov states. Then, we prove that each non homogeneous quantum Markov state is diagonalizable. Namely, for each Markov state φ on the spin algebra $\mathfrak{M} := \overline{\bigotimes_{j\in\mathbb{Z}} \mathbb{M}_{d_j}(\mathbb{C})}^{C^*}$ there exists a suitable maximal Abelian subalgebra $\mathfrak{D} \subset \mathfrak{M}$, a Umegaki conditional expectation $\mathfrak{E} : \mathfrak{M} \mapsto \mathfrak{D}$ and a classical Markov measure μ on spec$(\mathfrak{D})$ such that $\varphi = \varphi_\mu \circ \mathfrak{E}$, the Markov state φ_μ being the state on $\mathfrak{D}$ arising from the measure μ. An analogous result is true for non homogeneous quantum processes based on the forward or the backward chain. Besides, using the diagonalizability of quantum Markov states, we determine the type of the von Neumann algebras generated by GNS–representation associated with translation invariant or periodic quantum Markov states.

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