

# A dual Markov model for filtering problems

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## Abstract

Within a hidden Markov framework, the law driving the signal process is of major interest in a wide variety of fields. Indeed, in such a context, the role played by the transition probability associated such a process turns out to be crucial for the computation of the filters. Here, we study a construction of continuous-time reversible Markov process with arbitrary but given invariant distribution, that, when assumed for the signal, leads us to computable and tractable expressions for the filters. Also, it allows us to calculate statistics associated to the filters. Furthermore, the construction guarantees the existence of a dual to the signal, which can be used to derive an alternative filter recursions. Some well know models fall within our construction.