

## Time-Discretization for Controlled Markov Processes Part II: a jump and Diffusion Application

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*Abstract:* In a first Part I ([24]) a method of time-discretization was investigated in order to approximate continuous-time stochastic control problems over a finite time horizon.

This approximation was based on using recursive discrete-time dynamic programming. To this end, three conditions are to be fulfilled:

- *Smoothness* of the continuous-time functions
- *Consistency* or convergence of the discrete-time generators
- *Stability* or uniform boundedness of the discrete-time constructions.

In this Part II, these conditions will be verified for two practical applications:

- A *controlled infinite server queue*, as example of a controlled Markov jump process
- A *controlled cash-balance model*, as example of a controlled diffusion model.

For both applications it is shown and illustrated that the discrete-time constructions lead to a computational feasible scheme to approximate the optimal cost function as well as to construct an  $\varepsilon$ -optimal control.

*Keywords:*

*AMS Subject Classification:*