

A turnpike property for a discrete-time linear optimal control problem with probabilistic constraints

RENÉ HENRION

Weierstrass Institute Berlin, Berlin, Germany

ABSTRACT

In this paper we consider optimal control problems that are governed by linear time-discrete dynamics with an initial condition, additive random perturbations in each step and a terminal condition for the expected values. The objective function consists of a term of tracking type for the expected values and a control cost. In addition, the feasible states have to satisfy a probabilistic constraint expressing the condition that the trajectories have to remain in a given set with at least some given probability. Potential applications can be found in reservoir management problems with uncertain in- or output. We provide sufficient conditions that imply that the optimal expected trajectories remain close to a trajectory that can be characterized as the solution of an optimal control problem without prescribed initial- and terminal condition. In this way we contribute to the study of the turnpike phenomenon that is well-known in mathematical economics and make a step towards the extension of the turnpike theory to problems with probabilistic constraints. This is a joint work with *Martin Gugat* from *Friedrich Alexander University, Erlangen, Germany* and *Holger Heitsch* from *Weierstrass Institute Berlin, Germany*.