1. Record Nr. UNINA9910983074203321

Autore	Meng Weijun
Titolo	Time-Delayed Linear Quadratic Optimal Control Problems / / by Weijun Meng, Jingtao Shi, Jiongmin Yong
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2025
ISBN	9789819618972 9819618975
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (245 pages)
Collana	SpringerBriefs on PDEs and Data Science, , 2731-7609
Altri autori (Persone)	ShiJingtao YongJiongmin
Disciplina	003
Soggetti	System theory Control theory Mathematical optimization Systems Theory, Control Optimization Teoria de sistemes Teoria de control Optimització matemàtica Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1 Introduction -- Chapter 2 Problem Lifting -- Chapter 3 Solutions to the LQ Problems.
Sommario/riassunto	This book characterizes the open-loop and closed-loop solvability for time-delayed linear quadratic optimal control problems. Different from the existing literature, in the current book, we present a theory of deterministic LQ problems with delays which has several new features: Our system is time-varying, with both the state equation and cost functional being allowed to include discrete and distributed delays, both in the state and the control. We take different approaches to discuss the unboundedness of the control operator. The open-loop solvability of the lifted problem is characterized by the solvability of a system of forward-backward integral evolution equations and the

convexity condition of the cost functional. Surprisingly, the adjoint equations involve some coupled partial differential equations, which is significantly different from that in the literature, where, the adjoint equations are all some anticipated backward ordinary differential equations. The closed-loop solvability is characterized by the solvability of three equivalent integral operator-valued Riccati equations and two equivalent backward integral evolution equations which are much easier to handle than the differential operator-valued Riccati equations used in the literature to study similar problems. The closed-loop representation of open-loop optimal control is presented through three equivalent integral operator-valued Riccati equations.