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Optimal control of averaged state of a population dynamics model. (English) Zbl 1481.49006

N'Guérékata, Gaston M. (ed.) et al., Studies in evolution equations and related topics. Cham: Springer. STEAM-H, Sci. Technol. Eng. Agric. Math. Health, 113-127 (2021).

Summary: In this chapter, we study the average control of a population dynamic model with age dependence and spatial structure in a bounded domain $\Omega \subset \mathbb{R}^3$. We assume that we can act on the system via a control in a sub-domain ω of Ω. We prove that we can bring the average of the state of our model at time $t = T$ to a desired state. By means of Euler-Lagrange first-order optimality condition, we expressed the optimal control in terms of average of an appropriate adjoint state that we characterize by an optimality system.

For the entire collection see [Zbl 1476.34004].

MSC:

49J20 Existence theories for optimal control problems involving partial differential equations
92D25 Population dynamics (general)
35Q93 PDEs in connection with control and optimization
93C05 Linear systems in control theory

Keywords:

population dynamics; average control; Euler-Lagrange formula

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