

THE MINIMIZATION OF THE MEAN SQUARE OF THE DEVIATION OF A RANDOM SIGNAL FROM A GIVEN TARGET*

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Abstract

In this paper we consider the problem of minimization of the mean square value of the deviation of a random signal $z(t_f)$ from a given target ζ . The random signal $z(t_f)$ represents the value at instant time t_f of an output of a controlled dynamical system described by an Itô differential equation. Both the case when the set of admissible controls consist of general nonanticipative stochastic processes and the case when only piecewise constant controls are available are analyzed. We show that in both cases the optimal controls are in affine state feedback forms. Explicit formulae of the gain matrices of the optimal controls are provided.

MSC: 93E20, 93C57, 49N10.

keywords: optimal control model, Itô differential equation, piecewise constant controls, sampled-data system.

1 Introduction

Tracking problems are often encountered in many applications and have received attention from the research community in the past few decades [2, 3, 8, 12, 18]. In the stochastic context this problem was studied in [10]

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