

Abstract

It is well-understood that the choice of experimental conditions for distributed systems has a significant bearing upon the accuracy achievable in parameter-estimation experiments. Since for such systems it is impossible to observe their states over the entire spatial domain, close attention has been paid to the problem of optimally locating discrete sensors to estimate the unknown parameters as accurately as possible.

The aim of this monograph is to give an account of both classical and recent work on sensor placement for parameter estimation in dynamic distributed systems modelled by partial differential equations. It constitutes an attempt to meet the needs created by practical applications through the development of new techniques and algorithms or adopting methods which have been successful in akin fields of optimum experimental design. While planning, real-valued functions of the Fisher information matrix of parameters are primarily employed as the performance indices to be minimized with respect to the positions of pointwise sensors. Particular emphasis is placed on determining the 'best' way to guide moving sensors and making the solutions independent of the parameters to be identified.