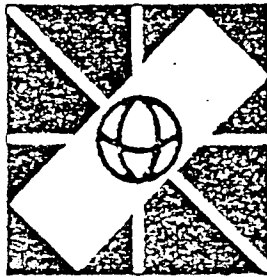


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EFFICIENT ALGORITHMS FOR OPERATOR RICCATI EQUATIONS  
AND APPLICATIONS TO DISTRIBUTED PARAMETER SYSTEMS

Abstract

Filtering and quadratic optimal control problems for linear distributed parameter systems lead to an operator Riccati equation. The applicability of the theoretical results is severely hindered by the task of solving this operator Riccati equation. The new Chandrasekhar type algorithms hold promise for significant reduction in the computational complexity of these problems. In this paper we study the operator Riccati equation with time varying operators, and derive various alternatives for the solution. As a result we: 1) rigorously establish the Chandrasekhar type algorithms for Linear Time Varying Distributed Systems; 2) rigorously establish the proper generalization of the partitioning algorithms for lumped systems of Lainiotis and Reid, to distributed systems. In addition the computational savings implied by these algorithms is discussed and their applicability and effectiveness is demonstrated by explicit examples for various distributed parameter systems.