Dynamic Transmit Covariance Design in MIMO Fading Systems With Unknown Channel Distributions and Inaccurate Channel State Information

ABSTRACT

- This paper considers dynamic transmit covariance design in point-to-point MIMO fading systems with unknown channel state distributions and inaccurate channel state information subject to both long term and short term power constraints.
- First, the case of instantaneous but possibly inaccurate channel state information at the transmitter (CSIT) is treated. By extending the drift-plus-penalty technique, a dynamic transmit covariance policy is developed and is shown to approach optimality with an O() gap, where is the inaccuracy measure of CSIT, regardless of the channel state distribution and without requiring knowledge of this distribution.

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- Next, the case of delayed and inaccurate channel state information is considered. The optimal transmit covariance solution that maximizes the ergodic capacity is fundamentally different in this case, and a different online algorithm based on convex projections is developed.
- The proposed algorithm for this delayed-CSIT case also has an optimality gap, where is again the inaccuracy measure of CSIT.

EXISTING SYSTEM

- In the wireless fading channel, where the channel changes over time, the problem of transmit covariance design is to determine the transmit covariance of the transmitter to maximize the capacity subject to both long term and short term power constraints.
- It is often reasonable to assume that instantaneous channel state information (CSI) is available at the receiver through training. Most works on transmit covariance design in MIMO fading systems also assume that statistical information about the channel state, referred to as channel distribution information (CDI), is available at the transmitter.

PROPOSED SYSTEM

- The proposed dynamic power allocation policy can be viewed as an online algorithm with inaccurate history information. The current paper analyzes the performance loss due to CSIT inaccuracy and provides strong sample path convergence time guarantees of this algorithm.
- The analysis in this MIMO context can be extended to more general online convex optimization with inaccurate history information.

HARDWARE REQUIREMENTS

Processor	-	Pentium-IV
Speed	-	1.1 Ghz
RAM	-	256MB(min)
Hard Disk	-	20 GB
Key Board	-	Standard Windows Keyboard
Mouse	-	Two or Three Button Mouse
Monitor	-	SVGA

SOFTWARE REQUIREMENTS

Tool	-	Network Simulator-2
Operating system	-	LINUX
Front end	-	OTCL (Object Oriented Tool Command Language)

REFERENCES

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