main notes

问题 理解

"Multiple Input Multiple Output (MIMO) detection is a common problem encountered in digital communications. In a MIMO system, several transmit antennas simultaneously send different data streams. The receiver often observes a linear superposition of separately transmitted information symbols. From the receiver's perspective, the problem is then to separate the transmitted symbols. This is basically an inverse problem with a finite-alphabet constraint.

多输入多输出(MIMO)检测是数字通信中经常遇到的问题。在MIMO系统中，多个发射天线同时发送不同的数据流。接收端经常会观察到单独传输的信息符号的线性叠加。从接收者的角度来看，问题是将发送符号分离。这基本上是一个带有有限字符约束的反问题。"

"This exercise consists of two parts: (a) formulate the MIMO detection problem as a suitable convex optimization problem; and (b) implement the MIMO receiver. In a group of 2 students, make a short report (4-5 pages; pdf file) containing the required Matlab scripts, plots, and answers. Also, prepare a short presentation to explain your results and defend your choices

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该工作包括两个部分：

(a)将MIMO检测问题建模为一个合适的凸优化问题；

(b) MIMO接收机的实现。在一组2名学生中，制作包含所需Matlab脚本、图表和答案的简短报告(4 - 5页; pdf文件)。此外，准备一个简短的陈述来解释你的结果和捍卫你的选择" (Delft, p. 1)

数据 解释

$$\mathbf{y}_c = \mathbf{H}_c\mathbf{s}_c + \mathbf{v}_c$$

"received data symbols y_c

, channel matrix, H_c

and the true data symbols s_c" (Delft, p. 2) 数据符号、信道矩阵以及真实数据符号

从y_c中检测s_c ?为什么用detect?

assignments

"Formulate the MIMO detection problem as an optimization problem. Suggest a suitable convex approximation (i.e., derive a convex relaxed problem) if the true problem is not convex. Motivate the proposed formulation as well as the relaxation

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将MIMO检测问题建模为优化问题。如果真问题不是凸问题，建议一个合适的凸近似(即,导出一个凸松弛问题)。激励提议的配方以及松弛"

"Implement the proposed convex optimization problem in your favorite off-the-shelf solver (e.g., CVX, SeDuMi, or YALMIP). How does this ready-made software solve your problem? Comment on the number of iterations, CPU time, and algorithm the ready-made solver uses. Optional : Does your solution based on randomized rounding follow Goemans and Williamson's theorem; see the reference

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在您喜欢的现成的求解器(如CVX、SeDuMi或YALMIP等)中实现所提出的凸优化问题。这个现成的软件是如何解决你的问题的?对现成的求解器所使用的迭代次数、CPU时间和算法进行评述。可选：基于随机取整的解法是否遵循Goemans和Williamson定理；见参考文献"

"Optional : Does your solution based on randomized rounding follow Goemans and Williamson's theorem; see the reference.

可选：基于随机取整的解法是否遵循Goemans和Williamson定理；见参考文献。"

"Implement a low-complexity algorithm (e.g., projected (sub)gradient descent for the above problem, or provide a first-order algorithm to solve the primal and dual problems). Compare the obtained results with the solutions from the off-the-shelf solver. Comment on the number of iterations, CPU time, and convergence of your low-complexity algorithm.

针对上述问题实现低复杂度的算法(例如,投射(sub)梯度下降，或者提供一阶算法求解原问题和对偶问题)。将得到的结果与现成的求解器的解进行比较。对低复杂度算法的迭代次数、CPU时间和收敛性进行评论。"

presentation

Referred in main notes

Delft - ET4350 Applied Convex Optimization.pdf

Meta Data

Title	Delft - ET4350 Applied Convex Optimization.pdf
Journal	
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