学术写作、规范与伦理
学术交流的形式和规范

张晗
Shanghai Jiao Tong University
Oct., 2022

学术交流有哪些形式？

- 广义的学术交流：
  - 讨论
  - 开组会
  - 审稿
  - 回复审稿意见
  - 参加学术会议
  - ……
- 狭义的学术交流（与大家**最相关、最需要技巧**的）：

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  - ……
- 狭义的学术交流（与大家**最相关、最需要技巧**的）:
  - 回复审稿意见
  - 做学术（组会）报告

内容

❶ **如何回复审稿意见**

❷ **如何做好学术（组会）报告**

内容

❶ 如何回复审稿意见

❷ 如何做好学术（组会）报告

来自审稿人的"毒打"

- "Reject 一More holes than my grand dad's string vest!"

- "This paper is desperate. Please reject it completely and then block the author's email ID so they can't use the online system in future. "

- "The writing and data presentation are so bad that I had to leave work and go home early and then spend time to wonder what life is about."

- "The peaceful atmosphere between Christmas and New Year was transiently disrupted by reading this manuscript."
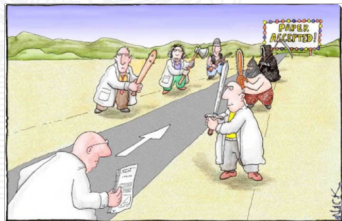
审稿人究竟在审文章的什么?

- 评估：
  - 文章的表述是否清晰
  - 证明 (技术细节、数学模型)
    是否详尽、有错误
  - 前后论证的逻辑、框架、方法
    是否自洽
  - 科学上的创新性
  - 对潜在读者是否有价值

	Excellent	Good	Fair	Poor
* Originality	○	○	○	○
* Quality of technical content	○	○	○	○
* Clarity of presentation	○	○	○	○

* Interest to readers
○ of great interest to most readers
○ of interest to most readers
○ of great interest to few readers
○ of little interest to many readers

审稿意见种类

- 最终结论种类
  - Reject
  - Major revision (Provisionally rejected, maybe re-submitted as regular paper/brief paper/technical note…)
  - Conditionally accepted
  - Accepted

- 审稿意见的种类

Technical	证明错误、数学模型不自洽、算法框架有问题等
Experimental	添加实验与分析（实验太简单）、实验不能验证你的论点
References	已有工作分析不够、你的 idea 早有人做了
Writing	表达不清晰、笔误、行文逻辑不行

回复审稿意见三要素

Reviewer: "Your results don't quite convince me, can you sent some supplementary material?"

Me:

- 态度决定一切
  - 认真：每条意见都是你论文中真实存在的问题，**千万别掩耳盗铃**！
  - 不卑不亢，据**理**力争
- 简明扼要，直击重点
- 明确地告诉审稿人和编辑你修改了那些内容

回复审稿意见的格式

- **标题**
- **Letter to Editor and Assiciate Editor**
- **逐条回复审稿意见**
- **在文稿中标出做了哪些改动**

Authors' Response to the Referee Reports for

Inverse Quadratic Optimal Control for Discrete-Time Linear Systems

(18-1290v2) 写文章的提交号

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Dear Prof. Petersen and Assiciate Editor:

First of all, we are thankful to the reviewers for reviewing our paper, as well as for in further improving the contents and presentation. We have carefully considered the comments raised by the reviewers and included corresponding modifications in the revised manuscript. A detailed reply to the review comments is given below. For convenience, we have copied the comments of the Reviewers in *italic* font and provide our replies in sans-serif font.

标明 Editor 和 Associate Editor

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Dear Prof. Pete

表示感谢；已充分考虑了审稿意见

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审稿意见和回复用不同字体表述，增加可读性

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Reviewer 1:
(1) Q: ...
A: ...
Reviewer 2:
(1) Q:...
A: ...
Reviewer 3:
  (1) Q:...

A: ...

逐个回复审稿人

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如何回复负面的审稿意见?

- 审稿人说的对, 写文章的时候的确有缺陷 (技术上的、表达上的)
- **审稿人水平有限没看懂，不懂装懂**!!

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- ☝️ → 👌 → 👐

  → "No one knows my paper better than I do!"

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- 不卑不亢, 据**理**力争, 要友善地与审稿人讨论

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如何回复负面审稿意见?

This paper is **not clear** about its contribution in **any field of theory or empirical studies**. For example, expressions in Sec. 3 like eq. (11) and (12) are **very unclear** to common readers. Moreover, the **significant difference** between the proposed approach and recent ones such as [1] and [2] together with [3] should be made clearly in revision.

如何回复负面审稿意见？

About the Pontryagin Maximum Principle (PMP) (Eq. (11) and Eq. (12)), we have added a reference for the common readers as preliminaries in our modified manuscript.

We would like to kindly point out that : although [1] considers ..., it only consi... ...red in our work. In particular, th... ... While our contribution for ... ...s ... Second, ... On the other ha... ...work differs from [2] and [3] in the following aspects: (1) The formulations of the ... problems are different. Both [2] and [3] considers ... (2)... is not considered in [2] and [3] while we proved ...

给你加了个参考文献，这种大家都知道的东西你还不知道，自己看去吧！

You idiot even didn't read what I wrote carefully!

如何回复负面审稿意见？

About the Pontryagin Maximum Principle (PMP) (Eq. (11) and Eq.

清晰地比较区别，logic flow + signposting, 友善地讨论

readers

We would like to **kindly** point out that : although [1] considers ..., it only considers ..., while ... is also considered in our work. In particular, the analysis in [1] is focused on ... While our contribution for ... is two-fold: first, we address ... Second, ... On the other hand, the contributions of our work differs from [2] and [3] in the following aspects:
(1) The formulations of the ... problems are different. Both [2] and [3] considers ...
(2) ... is not considered in [2] and [3] while we proved ...
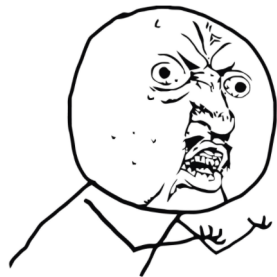
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用删除线标记删掉的内容，用蓝色标记添加的内容

~~Though our problem can be seen as a special case of the aforementioned inverse optimal control problems for nonlinear systems, we focus on the discrete finite time-horizon set-up. We also utilize the special structure of LQR to discuss the well-posedness and the identifiability of the problem. ....~~ Our focus is discrete-time finite time-horizon LQRs, whose problem set-up is different from those of aforementioned three works. In addition, all of them do not discuss the conditions for well-posedness and identifiability of the inverse optimal control problem and normalization and regularization techniques are needed for ...

内容

❶ 如何回复审稿意见

❷ 如何做好学术（组会）报告

学术（组会）报告的"惨剧"

做学术（组会）报告的要点

学术（组会）报告为什么难?

- 表达从来就不是一件容易的事！
- 从小语言的训练：语文、英语等，着重**听**、**读**、**写**的训练
- 很少有**说**的训练：如演讲、辩论等

做学术（组会）报告的要点

- 记住这个报告是讲给谁听的
- 听众并没有和你一样的知识（例：在组会上讲论文）
- 听众的接受速度并没有你想象得那么快（切忌出现大段文字）

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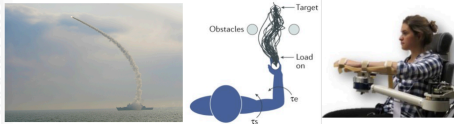- 听众的接受速度并没有你想象得那么快（切忌出现大段文字）
- **引导你的听众！**

报告的结构

- **Background & motivation**
  - Background
    Related work
    Aim of this work
- Problem formulation
- Sketch of technical details
- Simulation & experiment
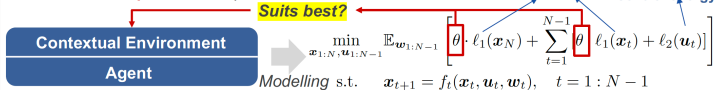- Conclusion & future work

让听众理解你研究的问题可以在什么领域被应用

Background & motivation

Missile interception   Sensori-motor   Rehabilitation robots

Tuning the weighting param θ **relies on experience and imagination**.

A fundamental problem of optimal control:

Suits best?

Contextual Environment

Agent

$$\min_{\boldsymbol{x}_{1:N}, \boldsymbol{u}_{1:N-1}} \mathbb{E}_{\boldsymbol{w}_{1:N-1}} \left[\theta \cdot \ell(\boldsymbol{x}_N) + \sum_{t=1}^{N-1} \theta \cdot \ell_1(\boldsymbol{x}_t) + \ell_2(\boldsymbol{u}_t) \right]$$

state error   control energy

Modelling s.t. $\boldsymbol{x}_{t+1} = f_t(\boldsymbol{x}_t, \boldsymbol{u}_t, \boldsymbol{w}_t), \quad t = 1 : N - 1$

$\boldsymbol{x}_1 = \bar{x}$

Idea of inverse optimal control:
  identify the **weighting param θ** from the **observed expert data**
Inverse optimal tracking:
  e.g: rehabilitation robot, track target **more like human**, improve treatment performance

报告的结构

- **Background & motivation**
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前人工作做了什么？什么没有做（即挑战和问题）？

Related work

Inverse optimal tracking problem:
    identify the **weighting param θ** in the objective function using **observed expert data**

    Noise

Estimation **robustness** against noise is still an issue

General nonlinear/LQ inverse optimal control framework

(Keshavarz, Wang, Boyd, 2011)
(Hatz, Schloder, Bock, SIAM 2012)
(Pauwels, Henrion, Lasserre, SIAM, 2016)
(Molloy, Ford, Perez, Automatica 2018)
(Jin, Kulic, Lin, Mou, Hirche, TRO 2019)
(Molloy, Ford, Perez, Automatica 2020)
(Westermann, Lin, Kulic, Scientific Report 2021)

Do not have **statistical consistency**
- Estimation result **sensitive to noise** in data
- Can not decrease the estimation error by adding data amount

报告的结构

- **Background & motivation**
  - Background Related work Aim of this work
- Problem formulation
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前人工作做了什么？什么没有做（即挑战和问题）？

- 可通过：
  - 最直观: 图、或动图对比说明
  - 列出表格

文献号	贡献	方法	局限
…	…	…	…

- 要点：
  - 总结这些前人工作对你的启发
  - 列出参考文献[1]
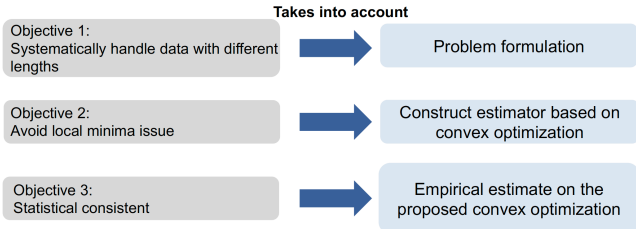
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[1]山崎丰子, **白色巨塔**, **xx 出版社**, **2020**.

报告的结构

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总结"挑战"，列出本工作要达成的目标

Aim of this work

Focus on inverse optimal tracking problem
- Use **different** estimator construction to **solve local minima issue** while keeping statistical consistency

reference signal

Special about tracking problem:
- In practice, "**when-to-start-tracking**" highly depends on the agent
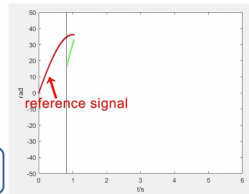
Different lengths of observed optimal tracking data
  ✗ Truncate the data to same length → lose information

Objectives: linear quadratic inverse optimal tracking that is:
1. Systematically handle data with different lengths
2. Avoid local minima issue   **Robust estimator**
3. Statistical consistency

报告的结构

- **Background & motivation**
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用逻辑图，将"目标"与"内容"对应

Sketch of our work

Takes into account

Objective 1: Systematically handle data with different lengths	→	Problem formulation
Objective 2: Avoid local minima issue	→	Construct estimator based on convex optimization
Objective 3: Statistical consistent	→	Empirical estimate on the proposed convex optimization

报告的结构

时刻提醒读者演讲逻辑

- Background & motivation
- **Problem formulation**
- Sketch of technical details
- Simulation & experiment
- Conclusion & future work

公式用框标出重要部分、补充说明

报告的结构

公式蜻蜓点水，只讲背后的 idea

Convexify the optimality conditions

- Background & motivation
- Problem formulation
- **Sketch of technical details**
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Ways to convexify a nonconvex problem:
- Lagrange dual
- Majorization minimization, etc.

Key issue
After convexification, whether the solution is **unique** and **coincides with** the "true" param

Our methodology: we can guarantee this.
Trick:

Non-convex Riccati iterations → Schur complement

$$H_t := \begin{bmatrix} B^T P_{t+1} B + I & B^T P_{t+1} A & B^T \eta_{t+1} \\ A^T P_{t+1} B & A^T P_{t+1} A + Q - P_t & q_t + A^T \eta_{t+1} - \eta_t \\ \eta_{t+1}^T B & q_t^T + \eta_{t+1}^T A - \eta_t^T & \xi_t \end{bmatrix},$$

Exactly the Riccati iterations

$$H_t \backslash (B^T P_{t+1} B + I) = \begin{bmatrix} \text{(Riccati Iteration 1)} & \text{(Riccati iteration 2)} \\ \text{(Riccati iteration 2)}^T & \star \end{bmatrix}$$

Use this nice property to design the objective function of the convex estimator

- 重要部分标出、补充说明

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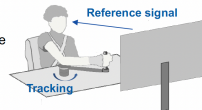
标出重要的趋势

Simulation

Human elbow rehabilitation tracking scenario
- Identify human's "tracking pattern" $\bar{Q}$
- **Track like a normal human**, improve the treatment performance
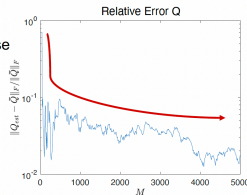
Dynamics of the device

Discretization

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} x + \begin{bmatrix} 0 \\ \frac{1}{J} \end{bmatrix} (u + w), \quad \Rightarrow \quad x_{t+1} = Ax_t + B(u_t + w_t)$$

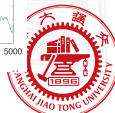Angular position & velocity   Torque

Aim of the simulation: to verify that we can kill the noise effect by adding data amount

The relative estimation error decreases as data amount increases, illustrating the statistical consistency

Reference signal

Tracking

Relative Error Q

- 总结 "take-home message"

报告的结构

- Background & motivation
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- Sketch of technical details
- Simulation & experiment
- **Conclusion & future work**

Conclusion & future work

- We design a **robust** inverse optimal tracking algorithm that is:
  - able to **systematically** deal with different observed data lengths
  - based on convex optimization, **avoiding local minima issue**
  - **statistically consistent**, robust against noise
- Both simulation and experiment show nice performance of the algorithm
- A good model and robust method to describe and identify **human tracking locomotion**

Future work: further apply the results to rehabilitation robot controller design

- 总结全篇报告：take-home message
- 要让听众觉得你的工作是成体系的，将来可以继续拓展

做幻灯片的软件

- ppt, keynote: 所见即所得，排版、绘制图像方便，动画表现力丰富
- **Latex beamer**: 写公式有得天独厚的优势，排版整齐素雅

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感谢聆听！