MAE286: Final presentations

Instructions

Everybody should read **all** the papers contained in the list below. Each of you is assigned **one** paper to present. You should know that understanding in depth all the developments of the paper you choose would probably require following up on some of the references mentioned in the article. Be ready to do that!

The paper will be orally presented to the class in the final week. The criteria for evaluation are:

- When presenting, clarity of the presentation, demonstrated understanding of the content, and handling of questions.
- When listening to a presentation, quality and pertinence of questions raised – that is why reading all the papers is important.
- A written report (max 2 pages) consisting of a summary of the paper, the lessons learned from the presentation and the Q&A and (about) 0.5-page description of potential ideas for future work.

Presentations will take place on **Dec 12**. The report is due by **Dec 15, midnight**, by email.

Each presentation will be 15min long. Writing on the whiteboard is the preferred media. You can also use the projector to show something useful, e.g., an illustrative simulation, a clarifying flowchart, etc. Presentations will take place according to the following assignments/schedule:

- 8:00am-8:15am: Ben-[P8]
- 8:15am-8:30am: Guillem-[P10]
- 8:30am-8:45am: Neilabh-[P5]
- 8:45am-9:00am: Velimir-[P1]
- 9:00am-9:15am: Michael-[P6]
- 9:15am-9:35am: Break
- 9:35am-9:50am: Xuting-[P7]
- 9:50am-10:05am: Carolyn-[P4]
- 10:05am-10:20am: Aleix-[P2]
- 10:20am-10:35am: Steven-[P3]
- 10:35am-10:50am: Anthony-[P9]

List of papers

A unifying event-triggered control framework based on a hybrid small-gain theorem

> [P1]: W. Wang, D. Nesic, R. Postoyan, and W. P. M. H. Heemels. A unifying event-triggered control framework based on a hybrid small-gain theorem. In *IEEE Conference on Decision and Control*, pages 4979–4984, Jeju Island, Republic of Korea, December 2020

Analysis of a simple neuromorphic controller for linear systems: a hybrid systems perspective

[P2]: E. Petri, K. J. A. Scheres, E. Steur, and W. P. M. H. Heemels. Analysis of a simple neuromorphic controller for linear systems: A hybrid systems perspective. *arXiv:2409.06353*, 2024

Hybrid zero dynamics of planar bipedal walking

[P3]: J. W. Grizzle and E. R. Westervelt. Hybrid zero dynamics of planar bipedal walking. In A. Astolfi and L. Marconi, editors, *Analysis and Design of Nonlinear Control Systems*, page 223–237. Springer-Verlag, 2008

Conflict resolution for air traffic management: a study in multiagent hybrid systems

[P4]: C. Tomlin, G. J. Pappas, and S. S. Sastry. Conflict resolution for air traffic management: A study in multiagent hybrid systems. *IEEE Transactions on Automatic Control*, 43(4):509–21, 1998

Definitions of incremental stability for hybrid systems

[P5]: R. Postoyan, J. J. B. Biemond, W. P. M. H. Heemels, and N. van de Wouw. Definitions of incremental stability for hybrid systems. In *IEEE Conference on Decision and Control*, pages 5544–5549, Osaka, Japan, December 2015

Dynamic event-triggered control: tradeoffs between transmission intervals and performance

[P6]: V. S. Dolk, D. P. Borgers, and W. P. M. H. Heemels. Dynamic event-triggered control: Tradeoffs between transmission intervals and performance. In *IEEE Conference on Decision and Control*, pages 2764–2769, Los Angeles, CA, December 2014

Event-triggered control for string-stable vehicle platooning

[P7]: V. S. Dolk, J. Ploeg, and W. P. M. H. Heemels. Event-triggered control for string-stable vehicle platooning. *IEEE Transactions on Intelligent Transportation Systems*, 18(12):3486–3500, 2017

Hybrid feedback control and robust stabilization of nonlinear systems

[P8]: C. Prieur, R. Goebel, and A. R. Teel. Hybrid feedback control and robust stabilization of nonlinear systems. *IEEE Transactions on Automatic Control*, 52(11):2103–2117, 2007

Laplacian sheep: a hybrid, stop-go policy for leader-based containment control

[P9]: G. Ferrari-Trecate, M. Egerstedt, A. Buffa, and M. Ji. Laplacian sheep: A hybrid, stop-go policy for leader-based containment control. In J. Hespanha and A. Tiwari, editors, *Proceedings of International Workshop on Hybrid Systems: Computation and Control*, volume 3927 of *Lectures Notes in Computer Science*, page 212–226. Springer-Verlag, 2006

Verisig: verifying safety properties of hybrid systems with neural network controllers

[P10]: R. Ivanov, J. Weimer, R. Alur, G. J. Pappas, and I. Lee. Verisig: verifying safety properties of hybrid systems with neural network controllers. In *Proceedings of International Workshop on Hybrid Systems: Computation and Control*, page 169–178. Association for Computing Machinery, New York, NY, 2019