# MAE286: Final project

## Instructions

Everybody should read **all** the papers contained in the list below. Each student should select **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, displayed 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 consisting of a summary of the paper, the lessons learned from the presentation and the Q&A and (about) 1-page description of ideas for future work.

The selection should be done by **Nov 2**. Presentations will take place on **Nov 30-Dec 2**. The report is due by **Dec 11, midnight**, by email.

Presentations will be 20min long and will take place according to the following schedule:

- Nov 30, Tuesday: Azad-[P5], Huazhen-[P6], Dean-[P3], Hamed-[P1]

- Dec 2, Thursday: Cameron-[P2], Mike-[P4], Michael-[P7]

## List of papers

Hybrid control of underactuated systems

> [P1]: J. Hespanha, D. Liberzon, and A. S. Morse. Logic-based switching control of a nonholonomic system with parametric modeling uncertainty. *Systems & Control Letters*, 38(3):167–177, 1999

Existence of Zeno trajectories

> [P2]: A. D. Ames, A. Abate, and S. S. Sastry. Sufficient conditions for the existence of Zeno behavior. In *IEEE Conf. on Decision and Control*, pages 4033–4038, Seville, Spain, 2005

Control of biped walking using hybrid systems

> [P3]: J. W. Grizzle. Remarks on event-based stabilization of periodic orbits in systems with impulse effects. In *Second International Symposium on Communications, Control and Signal Processing*, Marrakech, Morocco, 2006

Hardware limitations in implementation of control design

> [P4]: P. Tabuada. Sensor/actuator abstractions for symbolic embedded control design. In M. Morari and L. Thiele, editors, *Hybrid Systems: Computation and Control*, volume 3414 of *Lecture Notes in Computer Science*, pages 640–654. Springer, New York, 2005

Hybrid stabilization in quantized control

[P5]: D. Liberzon. Hybrid feedback stabilization of systems with quantized signals. *Automatica*, 39(9):1543–1554, 2003

Hybrid systems and model predictive control

[P6]: A. Bemporad, W. P. M. H. Heemels, and B. De Schutter. On hybrid systems and closed-loop MPC systems. *IEEE Transactions on Automatic Control*, 47(5):863–869, 2002

Hybrid stabilization of underactuated systems

[P7]: A. R. Teel and R. G. Sanfelice. On robust, global stabilization of the attitude of an underactuated rigid body using hybrid feedback. In *American Control Conference*, pages 2909–2914, 2008