

Online control of lab pond setup - change control period

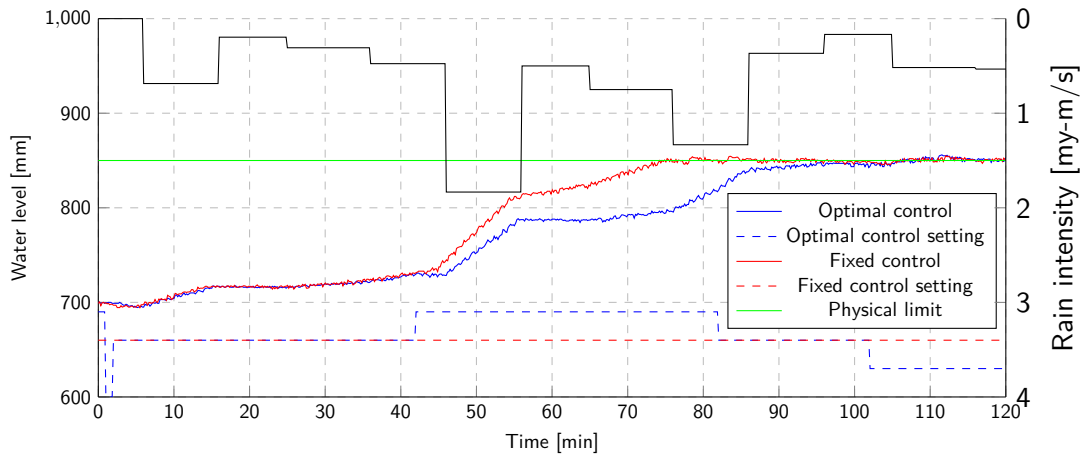
Experiment design and results

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Experiment design

- Online control: i.e., a strategy is synthesized periodically where the model is re-calibrated to the latest water level sensor reading.
- Experiment duration: 120 minutes.
- Rainfall data: first 120 minutes of the data.
- Initial water level: 700 mm.
- Physical water limit of setup: 850 mm.
- Duration single control period: **20 minutes** (used to be 10 minutes).
- Optimization cost function: $\min \mathbb{E}(o)$, where o is the accumulated overflow duration.
- Fixed outflow is setting 2 (approx. 50% of pump capacity).
- Learning budget parameters: `-good-runs 100 -total-runs 200 -runs-pr-state 100 -eval-runs 100`
- Discretization: 0.03.

Experimental results



Analysis

Possible explanations for results

- Learning took about 1 minute, so plenty of computational budget left.
- Switching to 20 minutes control period reduced the number of possible control sequences to analyze, hence more likely to observe a good control strategy during learning.
- Overflow is avoided much longer compared to static control.
- Once the water level gets close to maximum, it seems hard for learning to get out of this state.

Idea for next experiment

- Not only penalizing for overflow duration, but overflow amount. This seems to give better results when I run offline control on my local laptop.