Online control of lab pond setup - change control period

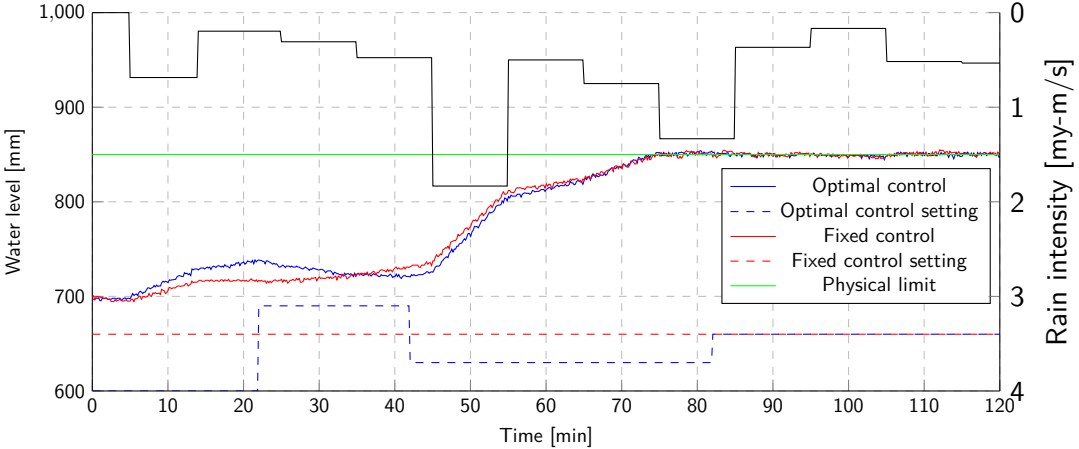
Experiment design and results

September 21, 2023

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 'bad' results

- Learning took about 1,5 minutes, so the new control action was applied 2 minutes after learning has started.
- Increase in control period results in less number of decisions to be made. On local laptop, this resulted in (more or less) consistent strategies with same learning budget.
- Results from server were still inconsistent.
- Identified an error in unit conversion. Original pond model had water level in cm, while setup works in mm. I converted model on local machine, but not on server.

Idea for next experiment

- Fix model on server and rerun the experiment.