Feedback Optimization at EuXFEL.

MT ARD ST3 Meeting

Beam Control Speedtalk

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Learning-Based Feedback Optimization

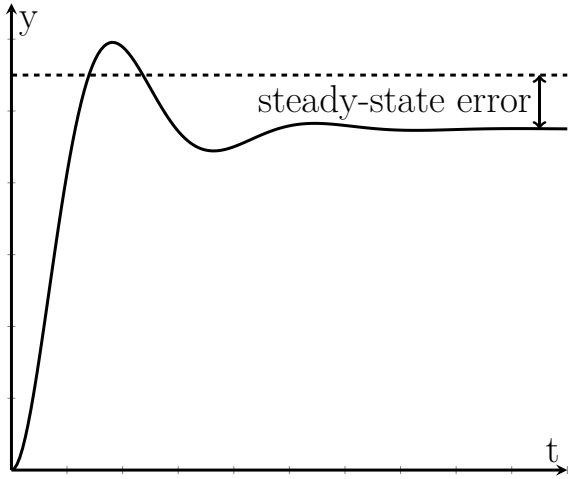
Steady-State Control for Dynamic Systems

- Problem: Find optimal steady-state pair (u, y)
- Solution: Gradient-based optimization

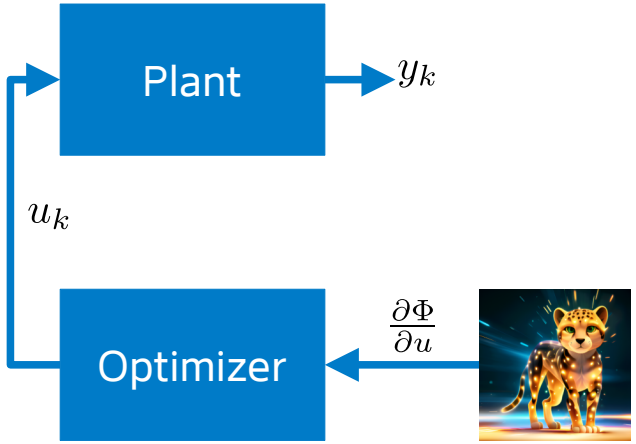
  a) Rely on model knowledge

  b) Approximate gradient by sampling & heuristics

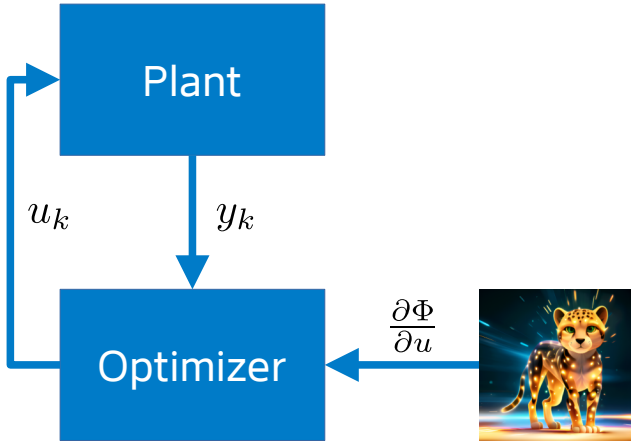
  c) Recursive estimation



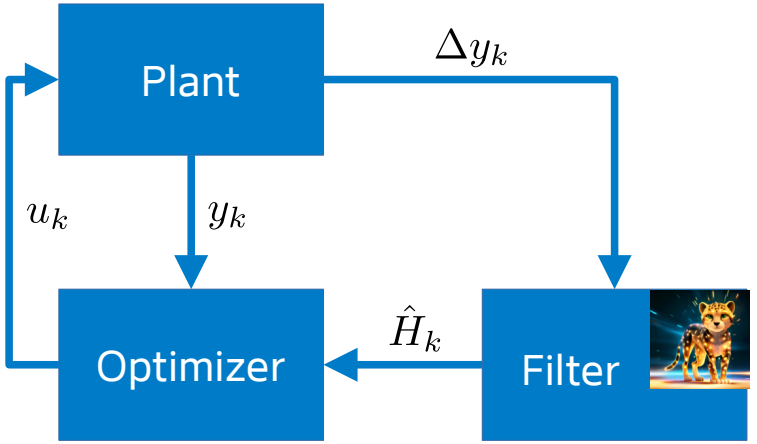
„Feedforward“ Optimization



Feedback Optimization



Learning-Based Feedback Optimization



Feedback Optimization for Beam Orbit Control

Scenario: EuXFEL Electron Dump Beamline

- Control drifting beam orbit
- Testbed for learning controllers
- Evaluated on the machine

Model-Free Optimization in Simulation

- Simultaneous learning and control
- Requires no *a priori* plant knowledge