

Iterative Control

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2. Introduction

2.1. Architecture

2.2. Model

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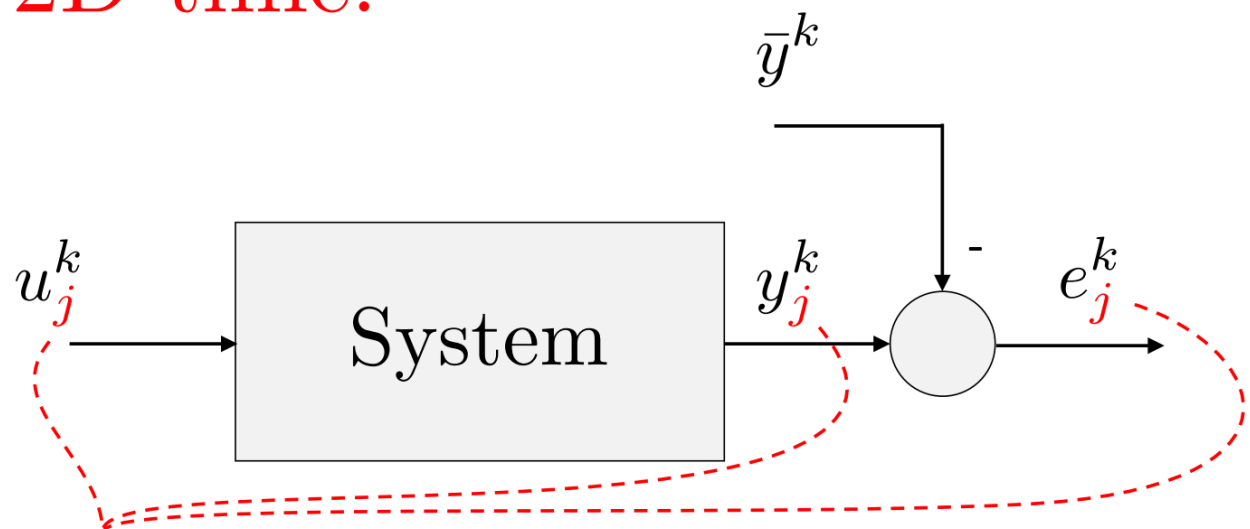
Simple Repetitions improve performance in prototypical motions



2. Introduction

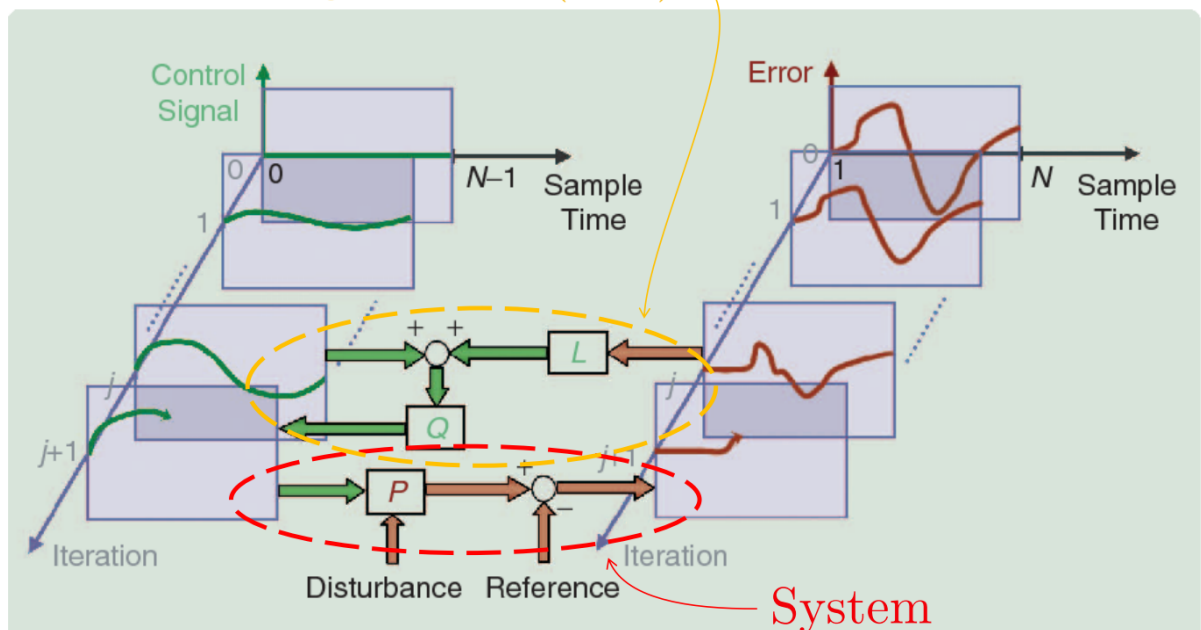
2.1. Architecture

2D time!



Iterations (trials, attempts, repetitions, ...)

Iterative Learning Control (ILC)



2.2. Model

Given **Desired Trajectory**: $\bar{y} : \{1 \dots N\} \rightarrow \mathbb{R}^m$

Find a **Learning Rule**: $u_{j+1}^k = F(u_j^k, e_j^k)$

s.t.:

If

- (dynamic model):

$$\begin{aligned}x_j^{k+1} &= A(k)x_j^k + B(k)u_j^k \\y_j^{k+1} &= C(k+1)x_j^{k+1} + D(k+1)u_j^{k+1}\end{aligned}\tag{1}$$

And

- (same initial condition)

$$x_j^0 = x_{j+1}^0, \quad \forall j\tag{2}$$

Then (**Asymptotically perfect execution**)

$$\lim_{j \rightarrow \infty} y_j^k = \bar{y}^k, \quad \forall k \in 1 \dots N\tag{3}$$