

Iterative learning control for discrete linear time-invariant stochastic system with batch-varying reference trajectories

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In this study, we present iterative learning control (ILC) schemes for discrete linear time-invariant (LTI) stochastic system with batch-varying reference trajectories (BVRT). If reference trajectories change batch-to-batch, controller has different convergence property from the traditional ILC. First, we derive the convergence property and propose deterministic ILC combined with iterative learning identification for LTI system with BVRT. In the ILC problem, if the state and measurement noises exist, convergence rate and performance are reduced since the controller considers the difference arising from the noise as tracking error. To deal with such a problem, we propose two approaches. The first is based on a batch-domain Kalman filter, while the second approach is based on a time-domain Kalman filter. Simulation examples are provided to show the effectiveness of the proposed schemes.