Iterative learning model predictive control (ILMPC) for batch processes

오세규, 임유경, 이종민†
서울대학교
(jongmin@snu.ac.kr†)

Iterative learning control (ILC) is an effective control technique for improving tracking performance of batch processes under model uncertainty. In many ILC algorithms, input sequences for current batch are calculated using tracking error sequences of previous batch. This type of ILC is open-loop control within a batch and it cannot handle real-time disturbances. ILC should be integrated with real-time feedback control for rejecting the disturbances. Model predictive control (MPC) has become the accepted standard for complex constrained MIMO control problems in the process industries. In this study, we propose MPC technique combined with ILC. This proposed technique, called iterative learning model predictive control (ILMPC), uses an incremental state-space model for including integral action. In many previous ILC combined MPC do not have integral action; thus, offset is arisen in the early batches before batch-wise controller is converged. The proposed ILMPC is similar to general MPC and relatively simple. Thus, it can easily reflect various considerations such as disturbance model, time-varying system or stochastic characteristics.