# Development of Batch Proportional-Integral-Derivative Controller

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Iterative learning control (ILC) methods have been developed to improve the control performance of the batch process continuously as the batch number increases by considering the previous batch operation data sets in a systematic way. Though the methods show excellent control performances for batch processes, their usage in real plants is limited because they require accurate process models. The batch process usually shows highly nonlinear dynamics, making the accurate modeling very difficult. In this research, batch-type proportional-integral-derivative (PID) and its tuning rule are developed to overcome the problems of the previous ILC methods. Because the proposed method has the same simple structure as that of the conventional PID controller, the requirement for accurate model is not strict and the parameter tuning is simple and intuitive and also, it does not use the process model, making it very robust to uncertainties such as disturbances, noises and nonlinearity. Simulation study shows that the proposed method and its tuning rule provide acceptable robustness to the nonlinearity of the process and excellent control performances for various setpoint tracking and disturbance rejection problems.