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Abstract
The “predictor-corrector” feedback controller, a process adjustment scheme proposed for semiconductor manufacturing run-to-run processes that drift, is extended to the random stopping case in the number of sampling. The controller is based on single and double exponentially-weighted-moving-average (EWMA) statistics, thus its performance depends on the choices of EWMA discounted factors. Stability conditions are given for a nonstationary ARIMA process proposed by Tseng et al. (2002) and adjusted with a MISO double EWMA (dEWMA) controller.

Under a linear SISO process setting, this research minimizes the Mean Square Error (MSE) performance of the process output has been investigated under the assumption that the process disturbance is IMA(1,1) series. In order to reduce the manufacturing costs, we also propose an economic design of EWMA controllers, which are also called “optimal stopping-time problems”, and some related result is driven. Some robustness and sensitivity results are also obtained for the single EWMA controller and the double EWMA controller.
Advisory Committee Ju, Da-jung - advisor

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