Delta-form LQG Control Technique combined with
Run-to-Run Improvement of Feedforward Signal for
Wafer Temperature Uniformity in 12-inch Rapid Thermal Processing

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A constrained iterative learning control (ILC) technique based on a delta-form linear quadratic Gaussian (LQG) technique has been designed for overcoming model error and numerically stable control of a rapid thermal processing(RTP). The delta form LQG control technique was applied for accurate control in high frequency caused by short sampling time. The designed control technique, ILC, acquired both numerically stable and to overcome model error in combination with the multivariable delta form LQG technique. A structural problem of the equipment or an excessive model error may cause physically unreasonable solution computed by the delta form LQG. For this, Constraints were applied to the ILC solution to be placed on the physically reasonable area. Cubic spline approximation was used as a numerical method to approximate time-varying gain matrices. The method remarkably reduced not only a computation time, but also a data transmission time from computer to DSP board in RTP equipment.