Anti-Windup Techniques in Cascade Control System

배정은, 황정아, 권원현, 추승철, 성수환[†]

경북대학교

(suwhansung@knu.ac.kr[†])

New anti-windup techniques for the cascade control system are developed. The cascade control system has two control loops, a primary(master) control and a secondary(slave) control. Therefore, the anti-windup technique must be applied to all of the two controls. The first anti-windup technique is a conditional integration. The integral term of the secondary controller is updated only when the output of the secondary controller is within the limits of the actuator, but the integral term of the primary controller is updated only when both outputs of the two controllers are within the limits.

The other anti-windup technique is a back calculation. The tracking time constants of the two controllers are set to the corresponding integral time constant. In addition, a new correction factor is applied to the internal feedback term of the integral term of the primary controller in order to revise the scale error of the outputs of the two controllers.

The developed anti-windup techniques are applied to PROMONICON software. PROMONICON with the anti-windup shows fairly good control performance for a real process.