

위상지연이 고려된 상태관측기를 이용한 고밀도 HDD용 서보설계

김영훈* (삼성종합기술원) · 강성우*(삼성종합기술원) · 추상훈**(삼성전자)

Servo Design for High-TPI Hard Disk Drives Using a Delay-Accommodating State Estimator

Y. H. Kim, S. W. Kang, and S. H. Chu

Key Words : Hard Disk Drive, State-space Controller, State-space Observer, Demodulation

Abstract : In a hard disk drive (HDD) control system, a state-space controller/observer design is popularly adopted for its advantages such as effective filtering of position and velocity, use of estimation error to handle servo defects, etc. In this report, a systematic method is proposed to accommodate the transport delay in the plant dynamics into the state estimator. The delay considered here is defined to be the time lag between the idealized time of plant output (position) sampling and the time at which the corresponding control becomes effective at the input of our design-oriented plant model. Thus, it includes demodulation time, computational time, digital-to-analog conversion delay, time-lag due to finite bandwidth power amp, etc.

100 kTPI급 HDD TMR 설계를 위한 Suspension에 관한 연구

오동호* (삼성종합기술원) 강성우*(삼성종합기술원) 한윤식* 김영훈* 황태연*

A TMR Budget Design for 100kTPI Hard Disk Drives Using a Head Gimbal Assembly with Radial Motion Capability

D. H. Oh, S. W. Kang, Y. S. Han, Y. H. Kim, and T. Y. Hwang

Key Words : Hard Disk Drive, Position Error Signal (PES), Track Misregistration (TMR), Head Gimbal Assembly (HGA)

Abstract : In high-capacity disk drives with ever-growing track density, the allowable level of position error signal (PES) is becoming smaller and smaller. A substantial portion of the PES is caused by disk vibration. This can be reduced by using a head gimbal assemblies (HGAs) that do not confine the slider movement to the vertical direction to disks, but allow movement to the radial direction of disks with respect to disk vibration. Several types of HGAs are proposed for such radial motion of the slider. Experimental results show that the PES level is reduced by the proposed HGA-design concept.