

마이크로 광디스크 드라이브 서스펜션의 최적 설계

전준호[†] · 전정일^{*} · 박노철^{**} · 박영필^{***}

Optimal Design of Suspension for Micro Optical Disk Drive

Joon-Ho Jeon, Jeong-Il Chun, No-Chul Park and Young-Pil Park

Key Words : optical disk drive(ODD), head gimbal assembly(HGA), finite element method(FEM) modal analysis, sensitivity analysis, off-track error

Abstract : Servo performance of a disk drive is greatly affected by the mechanical resonance frequencies of the head gimbal assembly(HGA). It is important factor to allow broader bandwidth for servo system in improving overall drive performance. In this paper, an optimal design for ODD suspension is attempted to increase resonance frequencies. It was decided that the first resonant frequency in tracking direction was higher than 5kHz. The mode frequency variation for the change of design parameter was observed by modal analysis using the finite element method(FEM). The sensitivity matrix was calculated from the observed data and so through sensitivity analysis, an optimized ODD suspension was designed to have the resonant frequency over 6kHz.

Dynamic Analysis and Optimum Design of Suspensions for Information Storage Devices

Yunsik Kim and Jongsoo Lee

정보저장기기 서스펜션의 동특성 해석 및 최적설계

김윤식[†] · 이종수^{**}

Key Words : Optical Disk Drive(광 디스크 드라이브), Hard Disk Drive(하드 디스크 드라이브), Shape Optimization(형상 최적화), Suspension(서스펜션), Sway Mode(스웨이모드), Robust Design(강건 설계)

Abstract : To satisfy operation condition in information storage device, the suspension shape is very important since it correlates to dynamic characteristics. Therefore, it is necessary to analyze the dynamic characteristics by using finite element analysis, shape optimization. The suspension has various modes according to different kinds of frequency bandwidth. Sway mode and second torsion mode are especially critical among them. In this paper, we investigated method to improve bandwidth of sway and second torsion mode of HDD and ODD suspension by using shape optimization. We also investigate the robust design considering the manufacturing tolerance for the suspension.