오피스용 임의형상 제작 시스템의 통합과 제어

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Integration and control of SFF system for the office environments.

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Key Words: SFFS(임의형상제작시스템), SMCSPO(섭동관측기를 가지는 슬라이딩모드제어)

Abstract : SFFS(Solid Freeform Fabrication System) can quickly makes models and prototype parts from 3D computer-aided design (CAD) data. Three dimensional printing(3DP) is a kind of the solid freeform fabrication. A manufacture is made by the SFFS has the precision of the 50um. Therefore the x-y table of SFFS to move a printhead must be the system that has a high speed and accuracy. So we proposed the SMCSPO algorithm for SFFS. The major contribution is the design of a robust observer for estimating the state and the perturbation of the timing belt system, which is combined with a robust controller. The control performance of the proposed algorithm is compared with PD control by the simulation and the experiment. The control algorithm of the SFFS is presented in the office environment. The system between control system and printhead for the SFFS is also integrated.

오피스용 디지털 3차원 실물복제기 개발 및 성능평가

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Development and Performance Evaluation of a Digital 3D RODS for Office Type

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Key Words: SFF (임의형상제작), 3DP(3차원프린팅), 3D scanner(3차원스캐너)

Abstract : The digital three dimensional (3D) real object duplication system (RODS) consist of a optical 3D scanner and a solid freeform fabrication (SFF) system for office type. It can scan a 3D object rapidly, transmit data to other system and reproduce the copy thereof rapidly. In this research, full automatic 3D scanner and SFF system was developed. The 3D scanner has the motion stage of four axes. And the SFF system developed based on three dimensional printing (3DP) process. Also, the performance of developed system was evaluated. As the result, the duplication error of part was 300μm(X), 300μm(Y), and 800μm(Z) respectively.