

수동휠체어용 자동변속기어의 특성 분석

신응수[†](충북대) · 유문수^{*}(세계산업)**Characterization of an Automatic Transmission for Manual Wheelchairs**

Eung-Soo Shin and Moon-Soo Yoo

Key Words: Manual wheelchair(수동휠체어), Automatic transmission(자동변속), Motion analysis(동작분석), Joint loadings(관절하중)

Abstract : This work intends to investigate the propulsion characteristics of a manual wheelchair with an automatic transmission. A primary feature of the automatic transmission is its shift mechanism based on the distance traveled from rest. A planetary gear train with ratchets/pawls and bushes is employed to generate two-stage shift automatically. Motion analysis has been performed for measuring kinematic properties of the arm and then inverse dynamics has been done for estimating joint forces/torques. Results show that the two-stage transmission can greatly lower the joint loadings by the speed reduction, which eventually contribute to prevent joint injuries of wheelchair users.

4중 안정점을 가지는 일체형 메커니즘의 설계 및 제작

한정삼[†](안동대)**Design and Fabrication of a Quadstable Monolithic Mechanism**

Jeong Sam Han

Key Words: Bistability(쌍안정성), Quadstability(4중 안정성), Snap-through(스냅스투)

Abstract : This paper presents a novel quadstable monolithic mechanism (QsMM) which provides four stable equilibrium positions within its operation range. The quadstable mechanism has been realized from the use of both X- and Y-directional bistable structures which use curved snapping beams. A millimeter-scale brass mechanism was fabricated to test the quadstability and the displacement-load behavior and the prototype clearly demonstrated four distinct stable positions in its millimeter-scale stroke. The present quadstable monolithic mechanism seems to be able to use the mechanical multistability in micron-scale multiple switching and optical networking applications. We discuss the design concept, electromagnetic Lorentz-force actuation method, finite element simulation, fabrication, and experimental measurement of the proposed quadstable mechanism.