Vibration Control of an Axially Moving Belt by a Nonlinear Boundary Control
Ji-Yun Choi and Keum-Shik Hong (Pusan National Univ.)

In this paper, the vibration suppression problem of an axially moving power transmission belt is investigated. The equations of motion of the moving belt is first derived by using Hamilton's principle for systems with changing mass. The total mechanical energy of the belt system is considered as a Lyapunov function candidate. Using the Lyapunov second method, a nonlinear boundary control law that guarantees the uniform asymptotic stability is derived. The control performance with the proposed control law is simulated. It is shown that a boundary control can still achieve the uniform stabilization for belt systems.

A Study on the Autonomous Navigation of Rovers for Mars Surface Exploration
Han-Dol Kim, Byung-Kyo Kim (KARI)

In the planetary surface exploration, micro-rovers or nano-rovers are very attractive choices for a surface exploration system providing mobility functions and other features required in the surface probe missions at small mass and relatively small cost. This paper surveys and summarizes the requirements for Mars exploration rovers in micro or nano scale and outlines the control concepts for navigation including the obstacle/hazard avoidance and the path planning. In this context, autonomous reaction capabilities are the key elements to control design in conjunction with the remote control schemes to deal with the significant signal propagation delays. Other navigation and control aspects such as the instrument fine positioning and the flip-over of the rovers are also briefly introduced. The current technical limitations of the micro- and nano-rovers are summarized.

Design of Optimal Sampled-Data Controller for Continuous-Time Chaotic Systems
Kwang Sung Park, Jin Bae Park(Yonsei Univ.) and Yoon Ho Choi (Kyonggi Univ.)

In this paper, we propose new digital optimal control approach for controlling continuous-time nonlinear chaotic systems, which show very complex behavior and cannot be easily controlled by conventional control methods. Most real systems are represented as continuous-time system, whereas some control methods should be implemented under the condition of computer-based platforms, which are discrete-time systems. To achieve the control objective for chaotic systems successfully, the sampled-data controller, which considers the inter-sample behavior of the continuous-time systems effectively, should be needed. The proposed optimal controller is designed based on the linearized estimation model of chaotic systems. By the computer simulation, we show the control ...