

산업용 로봇의 소음/진동 저감 연구

이광열[†](한양대) · 정진태^{*}(한양대) · 정두한^{**}(한양대)
임흥순^{***}(현대중공업) · 김영환^{****}(현대중공업)

A Study of Industrial Robot for the Noise and the Vibration Reduction

Kwangyal Lee, Jintai Chung, Duhan Jung, Hueng Soon Yim, Young Hwan Kim

Key Words : industrial robot(산업용 로봇), noise reduction(소음저감), vibration reduction(진동저감), parametric study(매개변수 연구)

Abstract : The object of this study is an examination of source of robot noise and reduction of the noise and the vibration for an industrial robot system. As the first step in our study, the noise and the vibration from the robot are measured by microphones and by accelerometers and the source of the noise and the vibration are proved to be from the gear, shaft, and housing from the experiments. The occurrence of the noise may be classified according into kinds, Finally base on the result of the experiments, we consider a countermeasure for reducing the noise and the vibration of robot system by the parametric study.

산업용 로봇의 기어소음 특성 고찰

김동해[†](현대중공업(주)) · 이종문^{*}(현대중공업(주))

Investigation of Gear Noise for Industrial Robots

Dong-Hae Kim and Jong-Moon Lee

Key Words : Robot(로봇), Gear Noise(기어소음), Signal Processing(신호처리)

Abstract : An industrial robot noise has various noise sources such as gears, motors, bearings, and controller fans. Among these, gears are the most dominant source for noise. The gear noise, caused by tooth profile, elastic deformation, machining error and wear, is directly correlated with the transmission error of mating gear. Due to the fact that has several axis and many gears, it is difficult to understand the characteristics of the vibration and noise of robots. In this study, some advanced analysis techniques based on digital signal processing such as power spectrum, time spectral map, RPM map, and etc., were applied for locating the dominant frequency components of the robot noises and identifying their sources. The noise and vibration measurements were carried out at several points during the operation of each axis considering the effect of load and posture of the robot. Based on the results, proper countermeasures to reduce excessive noise level have been suggested considering the characteristics of sources.