실험계획법을 이용한 차량 공조시스템의 시끄러움과 날카로움 분석

심현진† · 윤태건* · 박상길* · 이해진*(한양대) · 이정윤**(경기대) · 오재응***(한양대)

Analysis of the 'Loud' and 'Sharp' of the HVAC System using the Design of Experiments

Hyoun-Jin Sim, Taekun Yun, Sang-Gil Park, Hae-Jin Lee, Jung-Yoon Lee and Jae-Eung Oh

Key Words: Subjective sound quality characteristic(주관적 음질 특성), Design of Experiment(실험계획법), Loud(시끄러움), Sharp(날카로움)

Abstract : Since human listening is very sensitive when the sound hit him, the subjective index of sound quality is required. Therefore, at each situation of sound evaluation its composed with the sound quality factor. But, when substituting the level of one frequency band we could not see the tendency of substitution at whole frequency band during the sound quality evaluation. In this study a design of experiment is used. The frequency domain is divided into an equally 12 parts and each level of domain whether is given increase or decrease due to the change of frequency band based on 'loud' and 'sharp' of the sound quality is analyzed. By using the design of experiment the number of test is reduce very effectively by the number of experiment and each band the main effect will be as a solution. The case of sound quality for 'loud' and 'sharp' at each band, the change of band (increase or decrease of sound pressure or keep maintain) which will be the most effects on the characteristics of sound quality can be identify and this will be able to us to select the objective frequency band. Through these obtained results the physical changes of level at arbitrary frequency domain sensitivity can be adapted.

탄성기초 위에 놓인 이동질량을 가진 크랙 외팔보의 동특성

안성진†(동의대) · 손인수*(동의대)
윤한익**(동의대)

Dynamic Behavior of Cracked Cantilever Beam on Elastic Foundations with Moving Mass

Sung-Jin Ahn, In-Soo Son and Han-Ik Yoon

Key Words: Moving Mass(이동질량), Elastic Foundations(탄성기초), Open Crack(개구형 크랙), Flexibility Matrix(유연행렬)

Abstract : In this paper, the effect of a moving mass on dynamic behavior of the cracked cantilever beam on elastic foundations is presented. Based on the Euler-Bernoulli beam theory, the equation of motion can be constructed by using the Lagrange's equation. The crack section is represented by a local flexibility matrix connecting two undamaged beam segments. That is, the crack is modelled as a rotational spring. This flexibility matrix defines the relationship between the displacements and forces across the crack section and is derived by applying fundamental fracture mechanics theory. The crack is assumed to be in the first mode of fracture. As the depth of crack is increased, the tip displacement of the cantilever beam is increased. When the depth of crack is constant, the frequency of a cracked beam is proportional to the spring stiffness.