상용 CFD코드를 이용한 횡류휀 공력소음 특성 해석

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Analysis of the aeroacoustic characteristics of cross-flow fan using commercial CFD code

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Key Words : cross-flow fan(횡류휀), CFD(전산유체역학), unsteady flow field(비정상 유동장), flow noise (유동 소음)

Abstract : In this study, a cross-flow fan system used in indoor unit of the split-type air conditioner is analyzed by computational simulation. A commercial CFD code - Fluent - is used to calculate the performance and its unsteady flow characteristics. The unsteady incompressible Navier-Stokes equations are solved using a sliding mesh technique on the interface between rotating fan region and the outside. The acoustic pressure is calculated by using Ffowcs-Williams and Hawkings equation. It is found out that the interaction between the impeller blade and stabilizer generates the dominant noise. Also, it is noted that trailing edge part of the impeller is important radiator for aeroacoustic pressure.

Satisficing Trade-Off 방법을 이용한 유한요소 모델 개선

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Finite Element Model Updating Using Satisficing Trade-Off Method

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Key Words : Model updating(유한요소 모델 개선), Multiobjective optimization(다목적 최적화), Satisficing trade-off method.

Abstract : In conventional model updating using single-objective optimization techniques, imcompatible physical data are compared with each other using weighting factors. There are no general rules for selecting the weighting factors since they are not directly related with the dynamic behavior of an updated model. So one of the most difficult tasks, in model updating study, is 'balancing among the correlations', i.e. 'trade-off'. In this work, a multiobjecitive optimization technique called 'satisficing trade-off method' is introduced to extremize several correlations simultaneously. The absurd need for the weighting factors can be avoided using this technique. And the updated model with the most appropriate correlations is obtained easily in interactive way. Expecially automatic trade-off is employed to increase the rate of convergence to the desired model. Its effectiveness is verified by application to a real engineering problem, HDD cover model updating.