

## 평판의 국부적인 기하학적 변형을 모사하는 등가 요소 생성

송경호<sup>†</sup> (KAIST) · 박윤식<sup>\*</sup>(KAIST)Dynamically equivalent element for an emboss  
embeded in a plate

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**Key Words** : Equivalent, Emboss, Groove, Dynamic, Plate, Shell

**Abstract** : Among many structural dynamics modification methods for plate and shell vibration problems, embedding an emboss to the surface is very efficient. But deciding an optimal position and shape using optimization algorithm needs defining geometry and remeshing the model for every iteration step to implement the method, which takes much numerical cost. An equivalent element produced here lessen the cost by representing the geometrical characteristics of an emboss using the element's material properties and thickness becoming an geometrically homegenous element of the base plate or shell. Some efficient factors which let the equivalent system have the same dynamical response as the original system embeded with emboss will be shown and the degree of equivlance will be tested in terms of natural frequency matching.

## 역 비고유치 BEM을 사용한 소리 급쇠의 외부 음향 홀로그래픽 재현

장순석<sup>†</sup> (조선대학교 정보제어계측공학부) · 이제형<sup>\*</sup>(조선대학교 정보제어계측공학부)Exterior Acoustic Holography Reconstruction of a Tuning  
Fork using Inverse Non-singular BEM

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**Key Words** : BEM, Holography, Tuning Fork, 3 Dimension, Non-singular, Inverse BEM, Pressure Field

**Abstract** : Non-singular boundary element method (BEM) codes are developed in acoustics application. The BEM code is then used to calculate unknown boundary surface normal displacements and surface pressures from known exterior near field pressures. And then the calculated surface normal displacements and surface pressures are again applied to the BEM in forward in order to calculate reconstructed field pressures. The initial exterior near field pressures are very well agreed with the later reconstructed field pressures. Only the same number of boundary surface nodes (1178) are used for the initial exterior pressures which are initially calculated by Finite Element Method (FEM) and BEM. Pseudo-inverse technique is used for the calculation of the unknown boundary surface normal displacements. The structural object is a tuning fork with 128.4 Hz resonant. The boundary element is a quadratic hexahedral element (eight nodes per element).