

## 위상최적설계를 이용한 CAD모델 구축

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### CAD Model Construction Using Topology Optimization

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**Key Words** : Topology Optimization, Digital image, CAD Model, Image Process

**Abstract** : Topology optimization is widely accepted as a conceptual design tool for the product design. Since the resulted layout of the topology optimization is a kind of digital images represented by the density distribution, the seamless process is required to transform digital images to the CAD model for the practical use. In this paper, the general process to construct a CAD model is developed to apply for topology images based on elements. The node density and the morphology technique is adopted to extract boundary contour of the shape and remove the noise of images through erosion and dilation operation. The proposed method automatically generates point data sets of the geometric model. The process is integrated with Pro/Engineer, so that the engineer in practice can directly handle with curves or surface form digital images.

## 구형 캡이 결합된 외팔 원통 셸의 고유진동 해석

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### Free Vibration Analysis of a Circular Cylindrical Shell with a Spherical Cap

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**Key Words** : Beam Function(보 함수), Combined Structure(조합구조물), Cylindrical Shell(원통 셸), Frequency Equation(진동수방정식), Mode shape(모드형상), Natural Frequency(고유진동수), Rayleigh-Ritz Method(레이레이 리츠법), Receptance(동적응답)

**Abstract** : The receptance method was applied for the analysis of a cylindrical shell with a spherical cap attached at an arbitrary axial position of the shell. The boundary condition of the shell considered here was clamped-free condition. Before the analysis of the shell/spherical cap combined structure, natural frequencies of the cap and the shell were calculated separately and then they were used in the calculation of the frequencies of the combined structure by the receptance method. The frequency equation of the combined structure was derived from the continuity condition at the junction of the shell and the plate. The frequencies for various curvature factors of the cap were presented and compared with those from ANSYS to validity of the present method.