

진동 실험

(제13주 : ANSYS 연습 - 고유진동)

2018. 11. 27. B

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1. 외팔보

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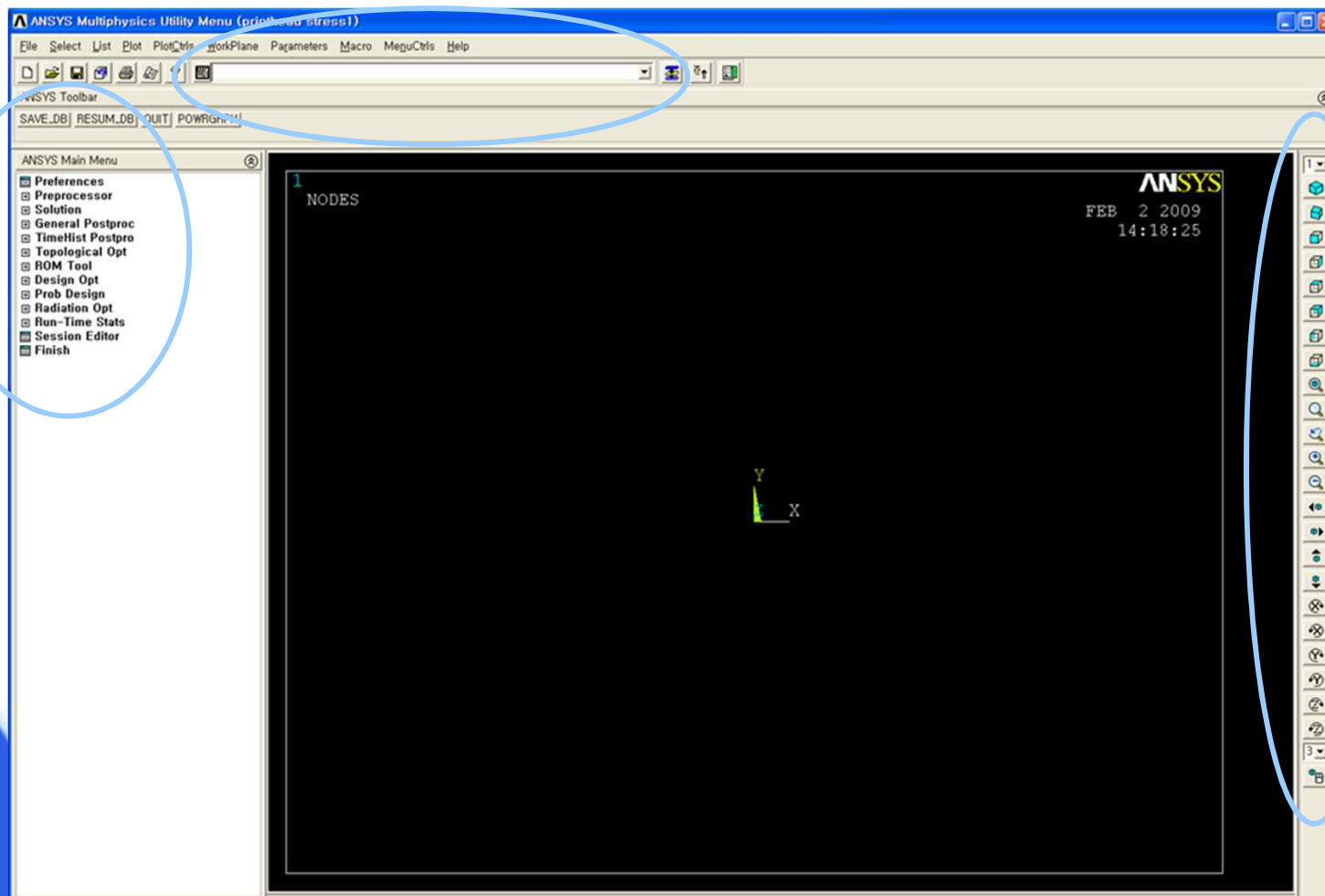
4. 사각 판

ANSYS의 구성 (1)

❖ 화면 구성 : ANSYS 클래식

명령어 입력창

Main menu



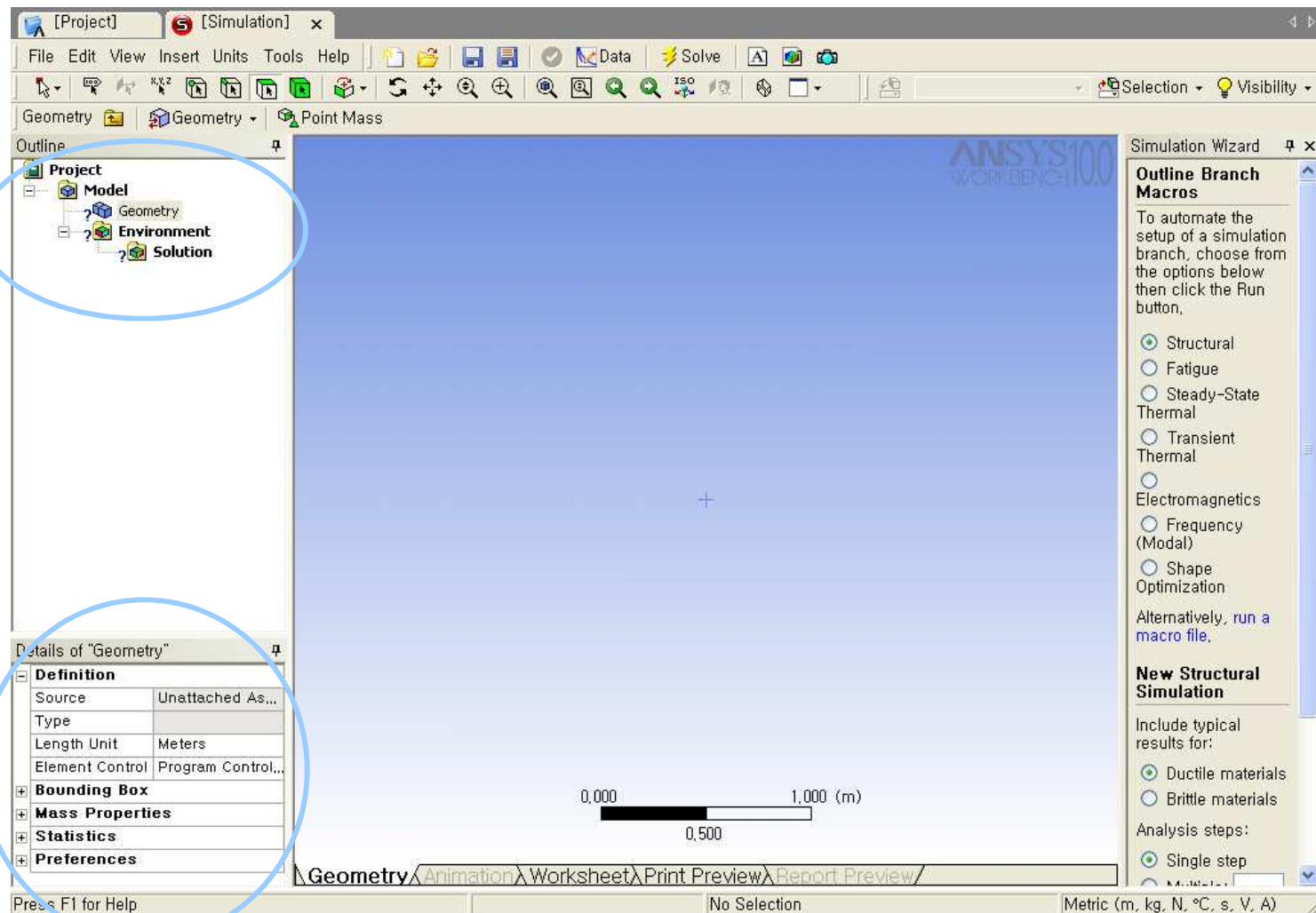
view menu

ANSYS의 구성 (2)

❖ 화면 구성 : ANSYS Workbench

상태 표시
및 실행

세부 정보



연습 1 (1)

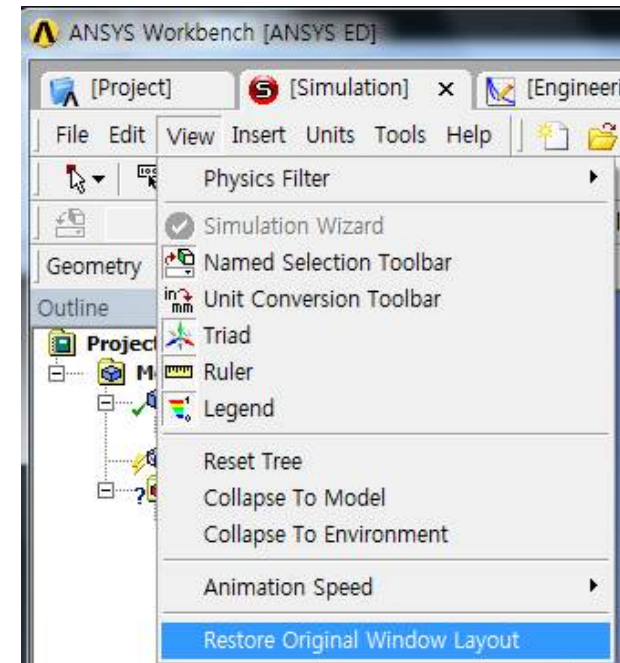
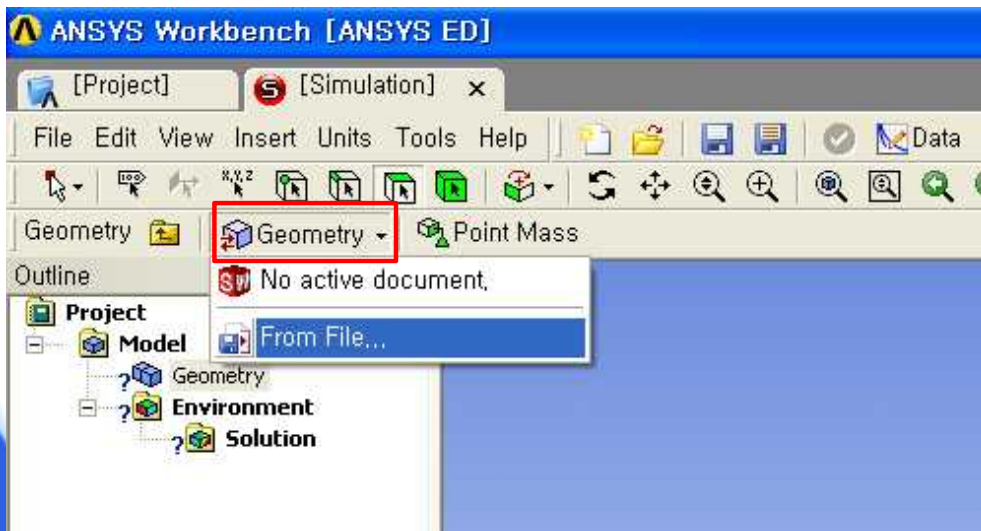
❖ 외팔보의 고유진동수 및 모드 형상



- 형상 : 폭 0.01 m, 높이 0.005 m, 길이 0.09 m
- 물성치 : 탄성계수 210 GPa, 포아송 비 0.3, 밀도 7,890 kg/m³
- 경계조건 : 고정(fixed) - 자유(free)

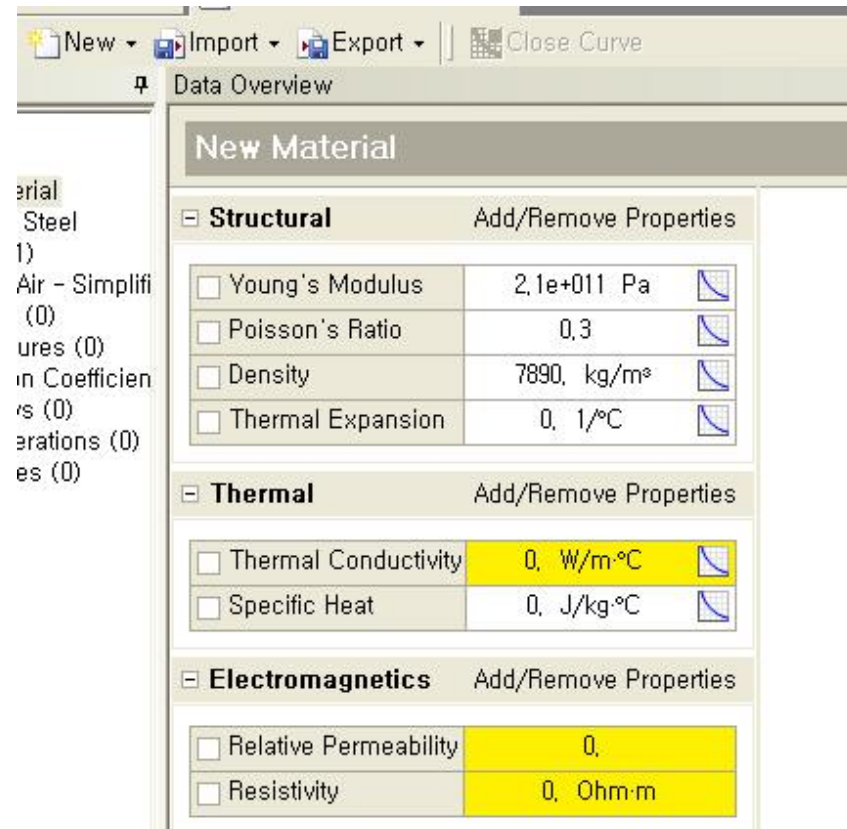
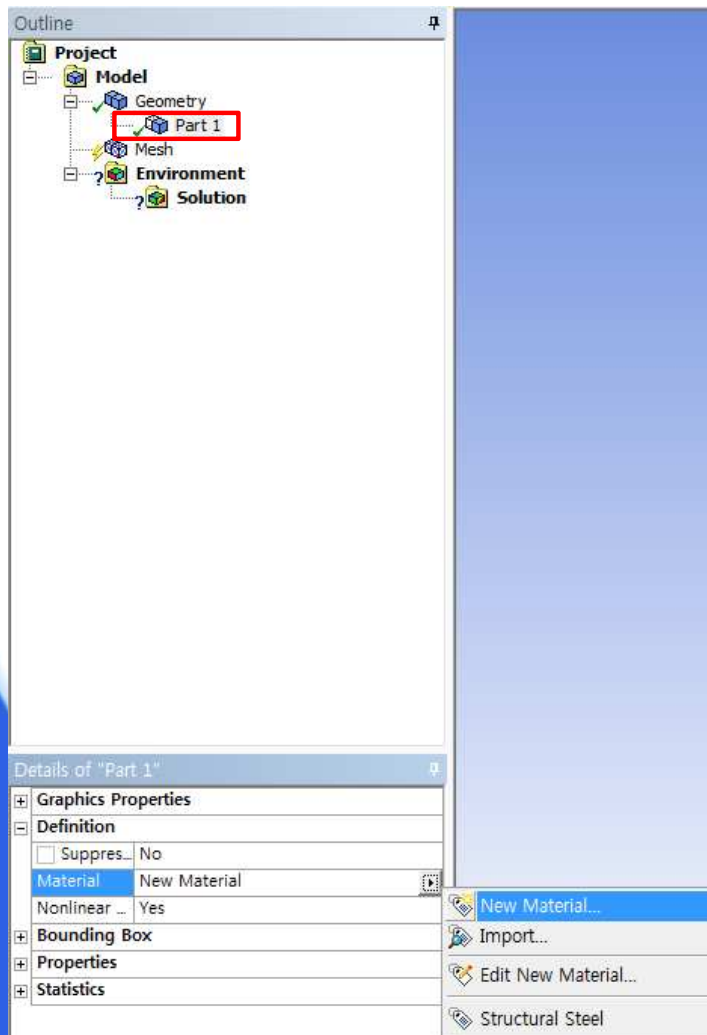
연습 1 (2)

- 모델링 및 ANSYS에서 불러오기
 - SolidWorks를 사용하여 모델링
폭 0.01 m, 높이 0.005 m, 길이 0.09 m
파일 저장 : 파일명 영문 사용, 확장자 Parasolid (*.x_t)
 - ANSYS에서 불러오기 (Geometry – From File)
 - 메뉴 상태 초기화 (View–Restore Original Window Layout)



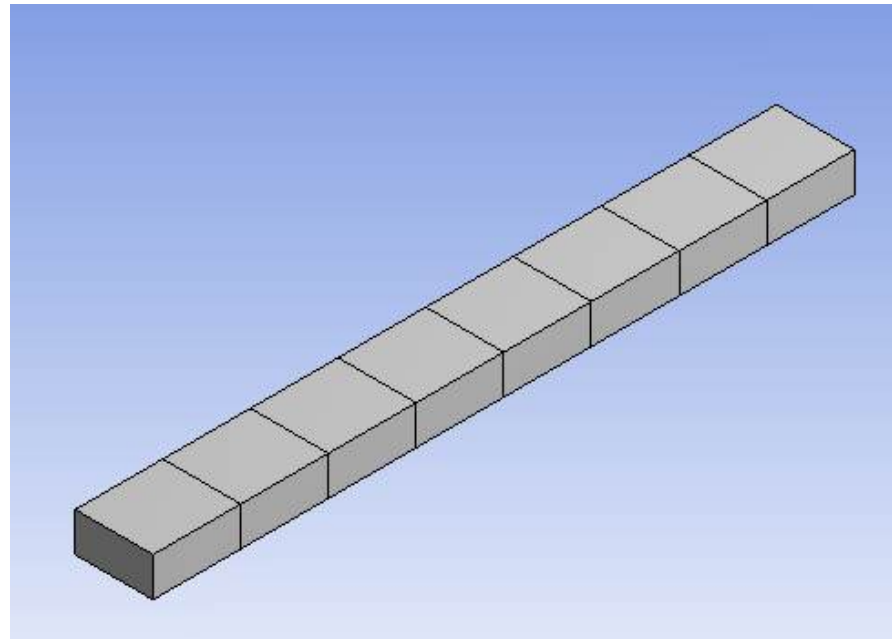
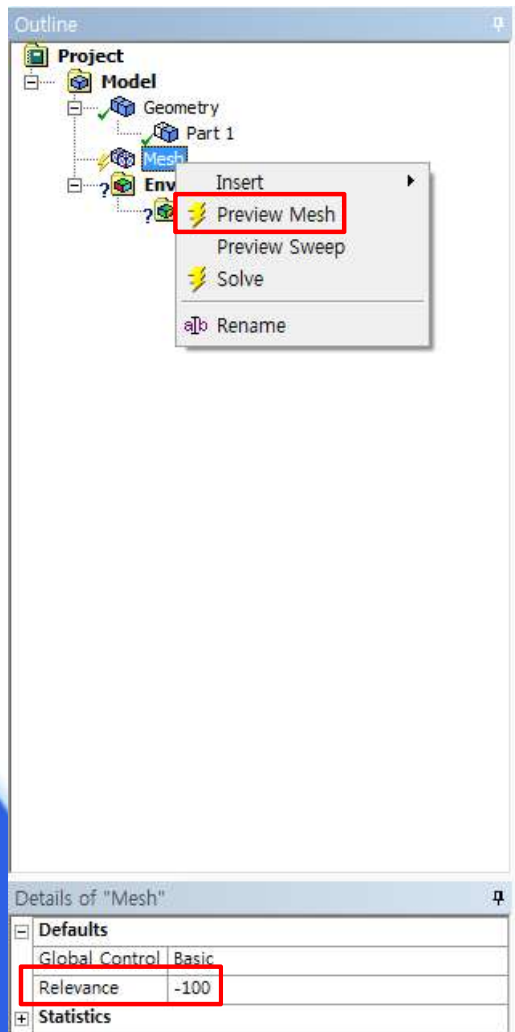
연습 1 (3)

- 물성치 입력 (Geometry-Part 1-Material - New Material)
 - 물성치
탄성계수 210 GPa, 포아송 비 0.3, 밀도 7,890 kg/m³



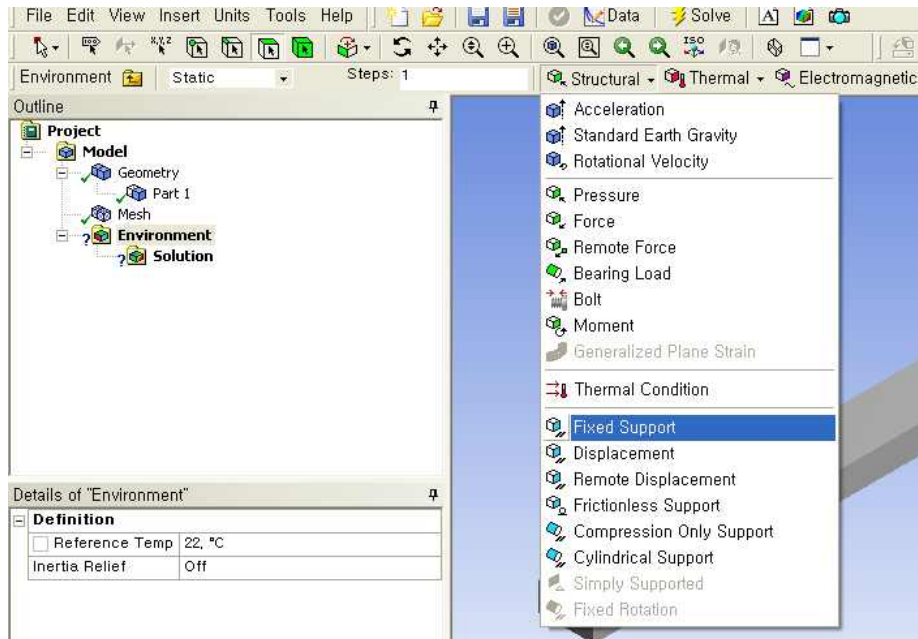
연습 1 (4)

- 유한요소 모델링 (Mesh - Preview Mesh)
- Mesh 크기 조절 (Mesh - Relevance 조절(-100~100))

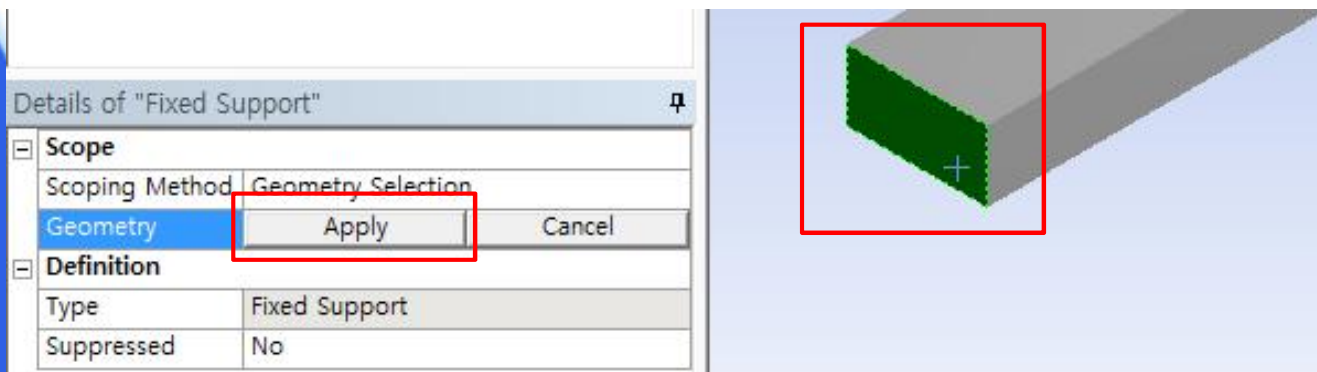


연습 1 (5)

- 경계조건 생성 (Environment – Structural)

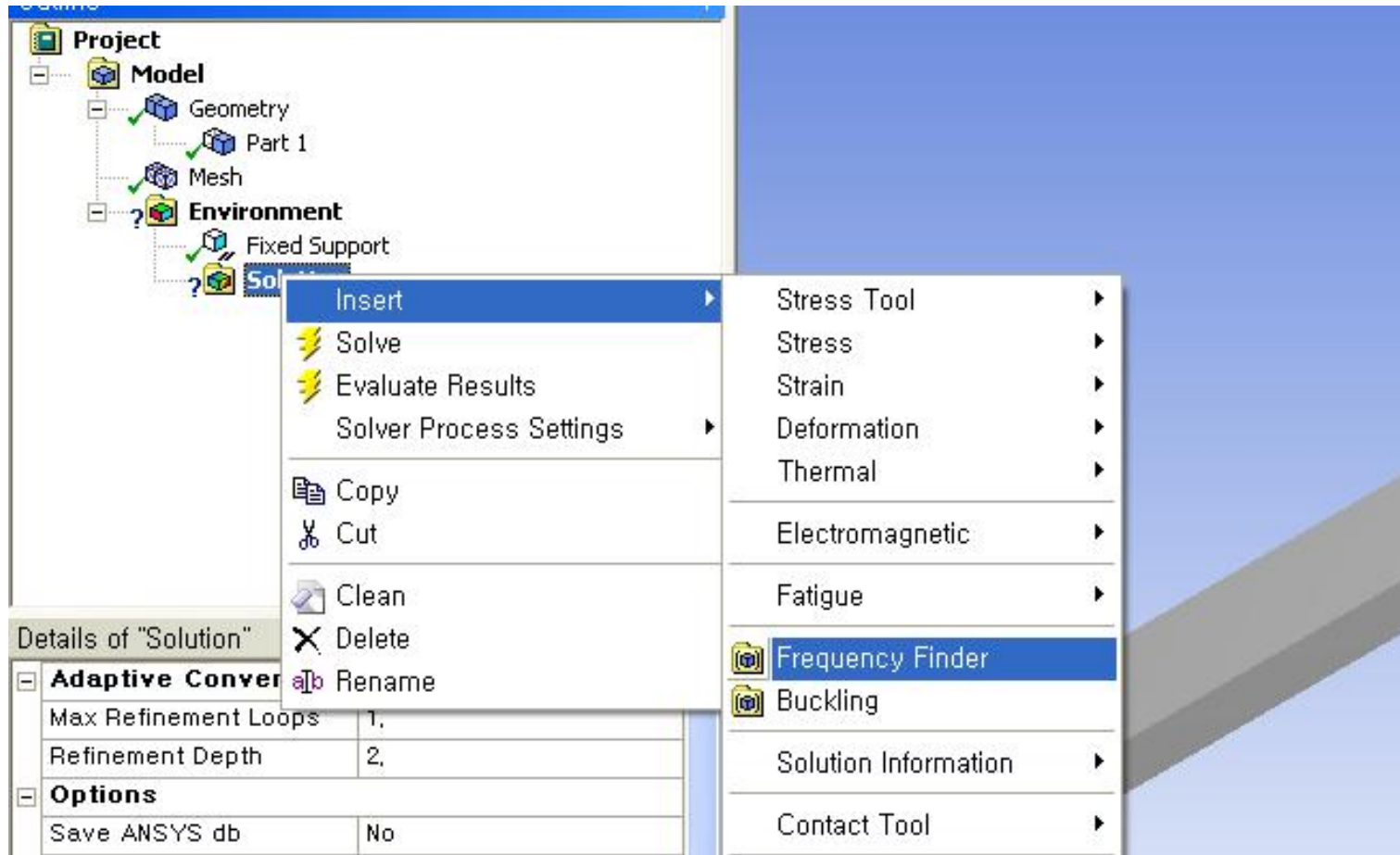


- 경계조건 설정 (경계면 설정(Click)-Geometry-Apply)



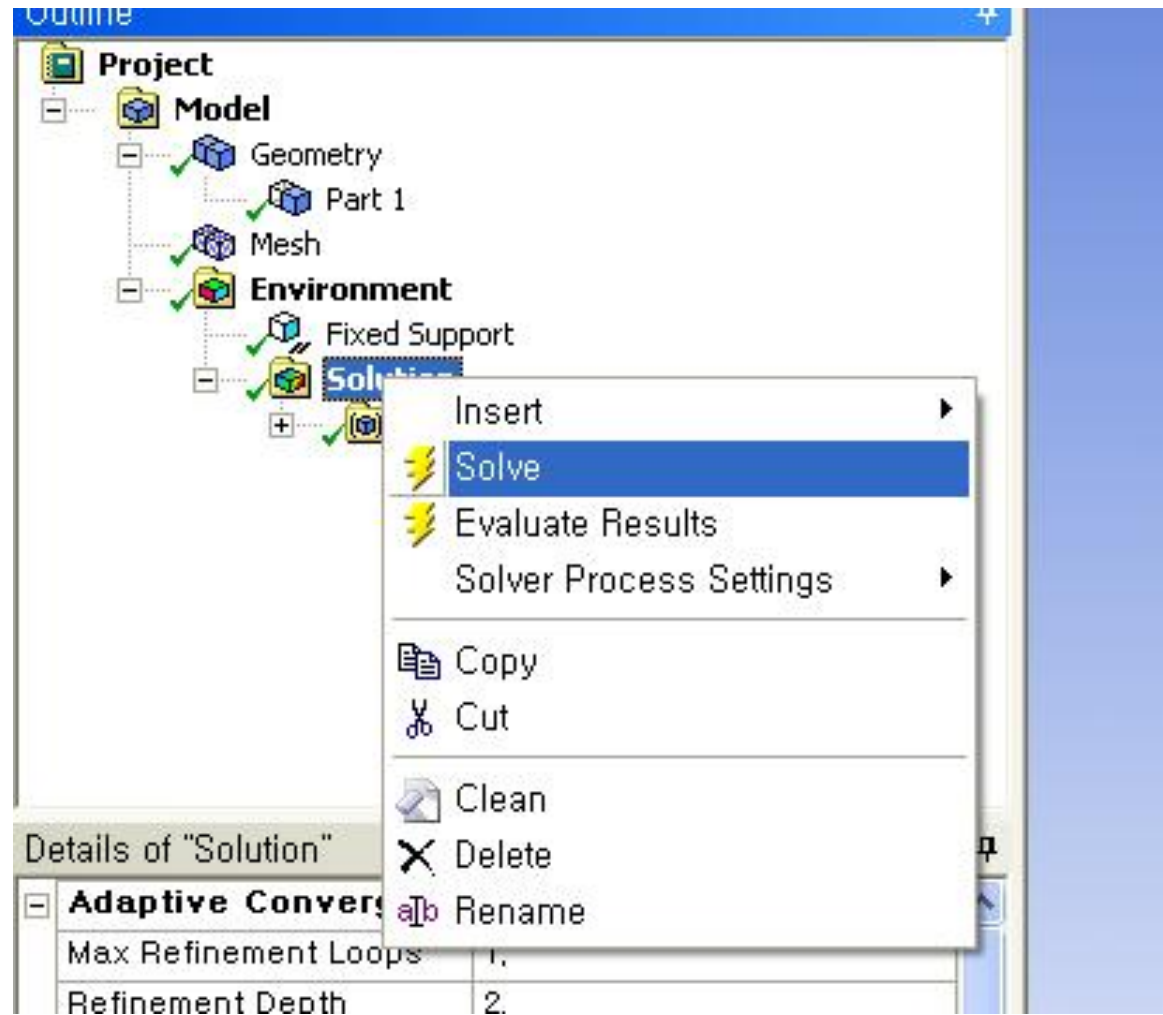
연습 1 (6)

- 고유진동 해석 선택 (Solution – Frequency Finder)



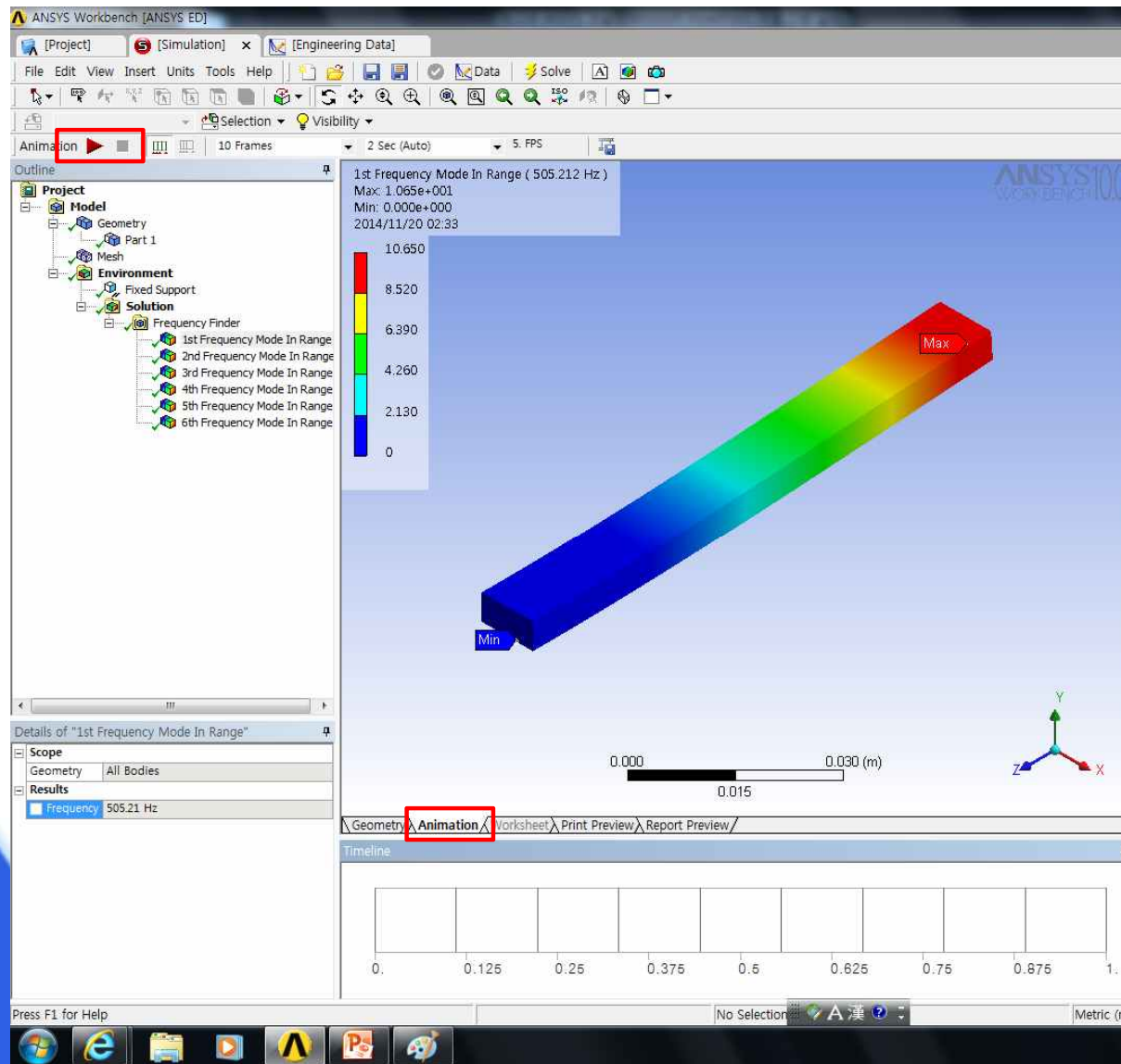
연습 1 (7)

- 해석 실행 (Solution - Solve)



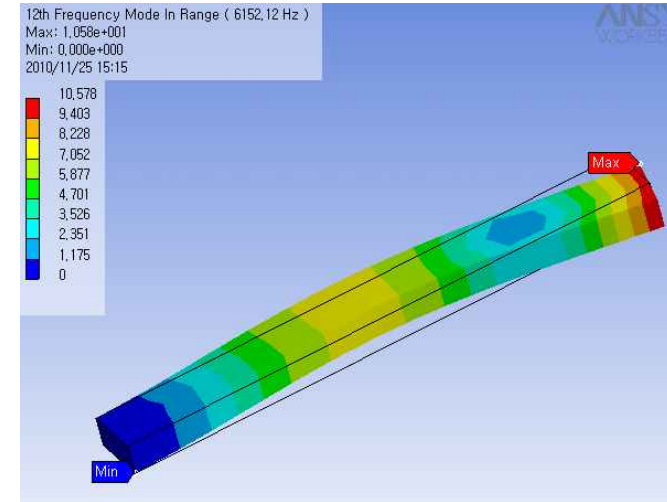
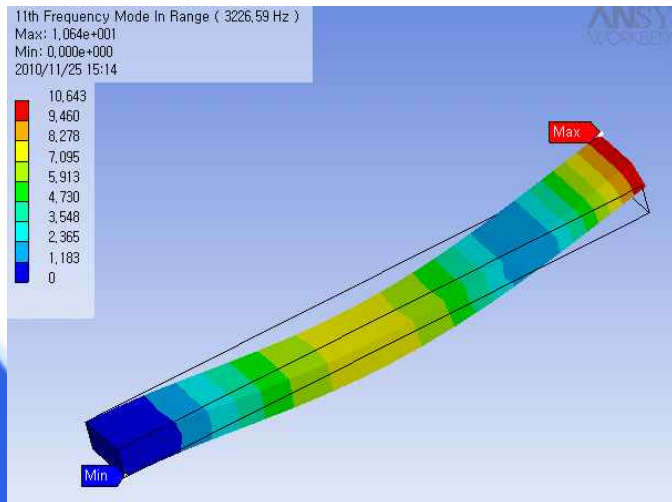
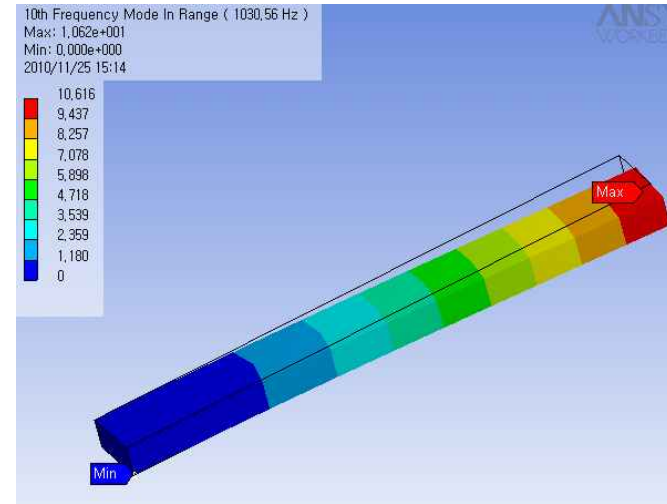
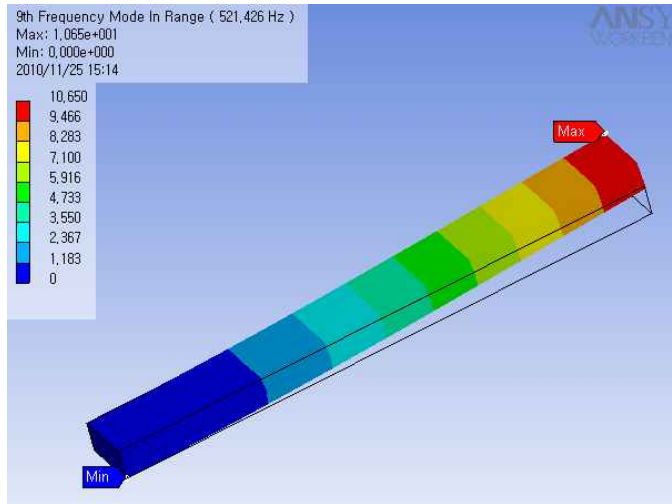
연습 1 (8)

- 애니메이션 (Animation)



연습 1 (9)

❖ 해석 결과



연습 2 (1)

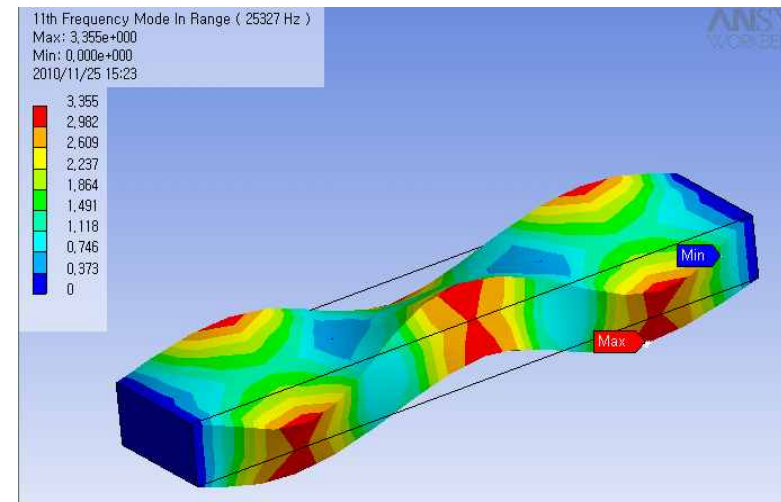
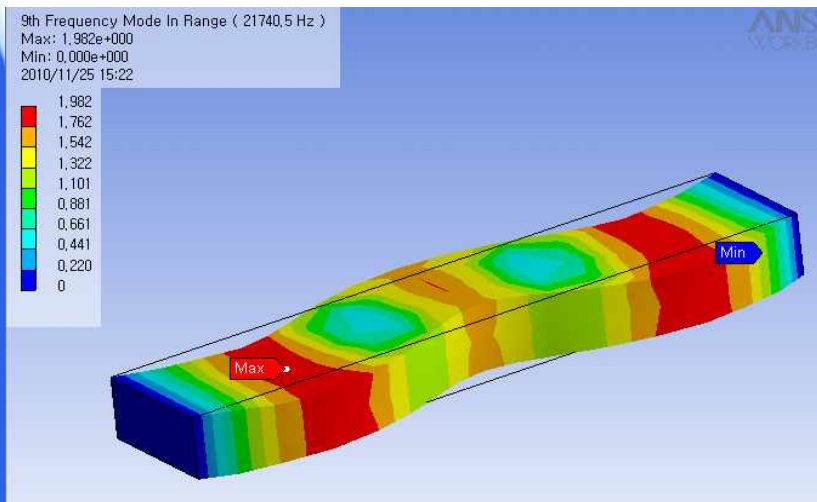
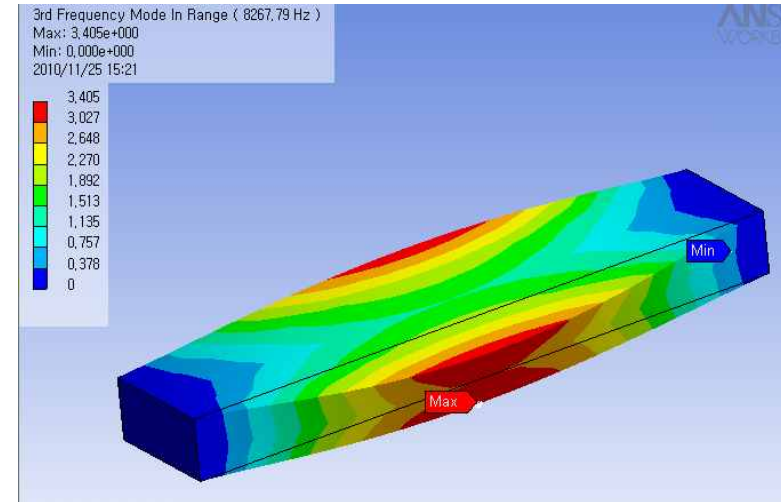
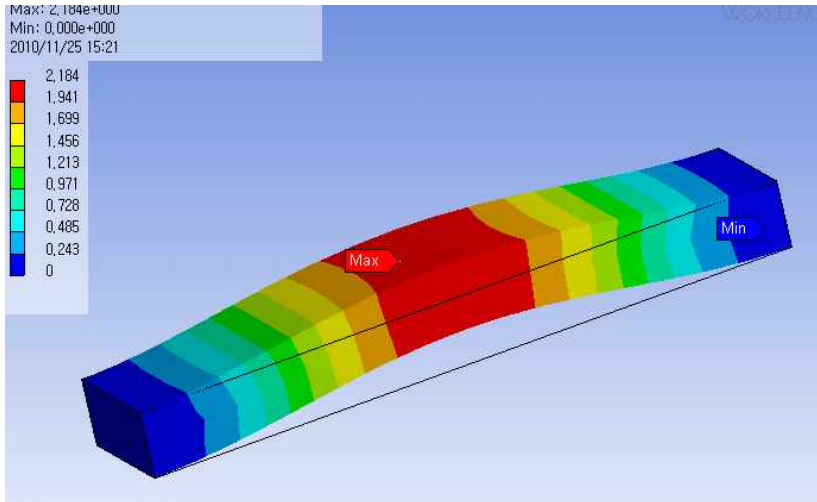
❖ 양단 고정정보의 고유진동수 및 모드 형상



- 형상 : 폭 0.03 m, 높이 0.015 m, 길이 0.15 m
- 물성치 : 탄성계수 200 GPa, 포아송 비 0.29, 밀도 7,890 kg/m³
- 경계조건 : 고정(fixed) - 고정(fixed)

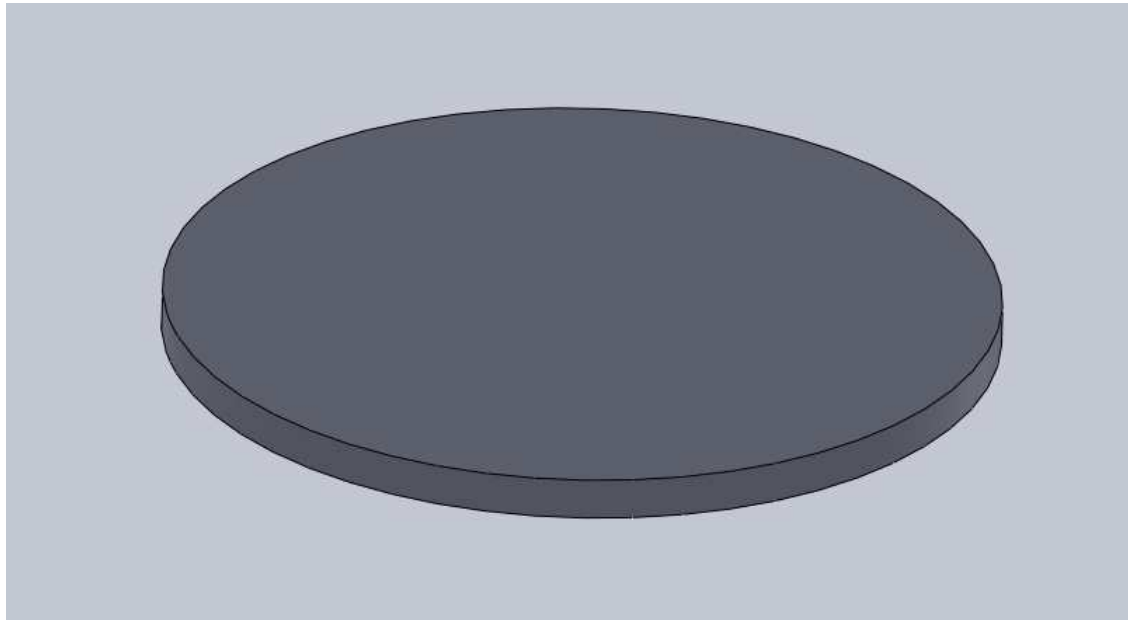
연습 2 (2)

❖ 해석 결과



연습 3 (1)

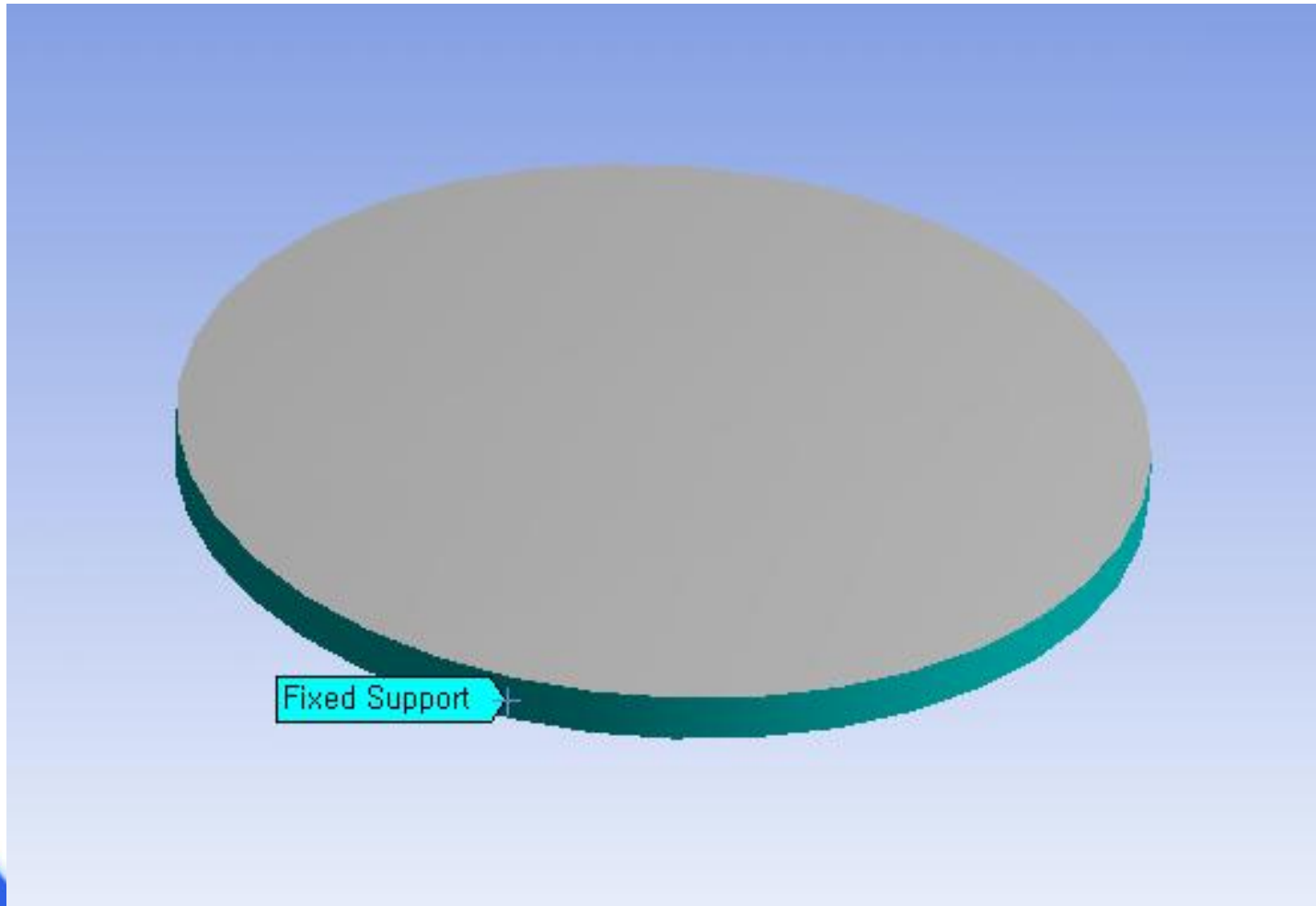
❖ 원형 판의 고유진동수 및 모드 형상



- 형상 : 지름 0.2 m, 높이 0.01 m
- 물성치 : 탄성계수 200 GPa, 포아송 비 0.25, 밀도 7,800 kg/m³
- 경계조건 : 테두리 고정(fixed)

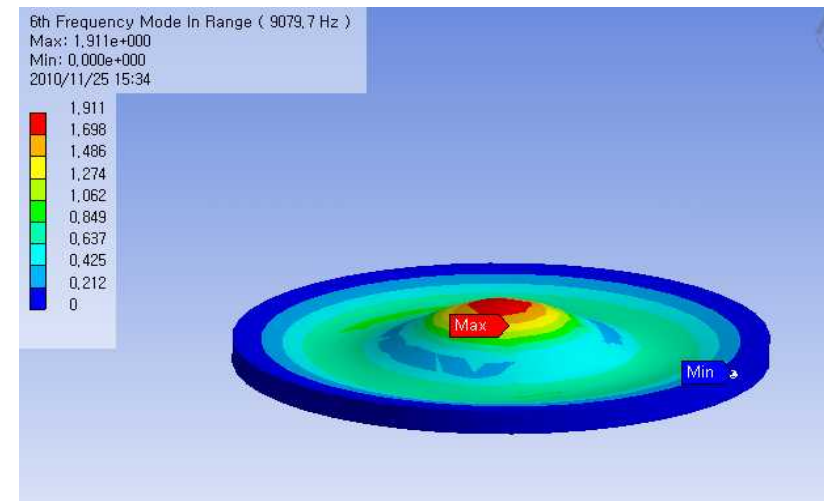
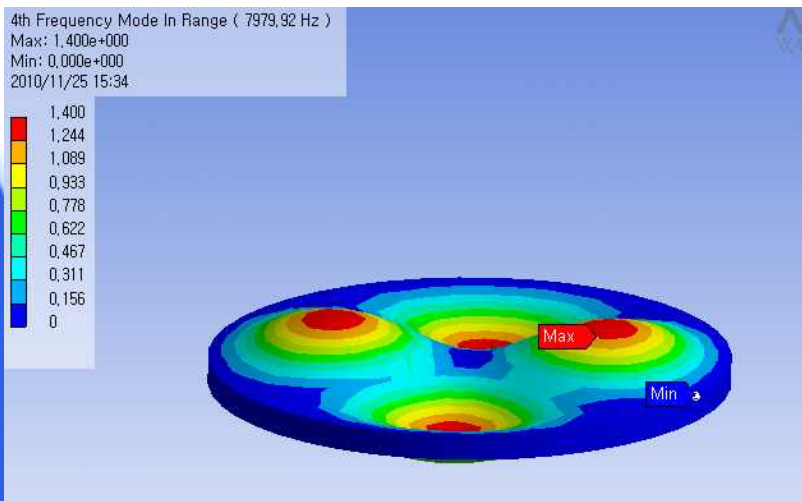
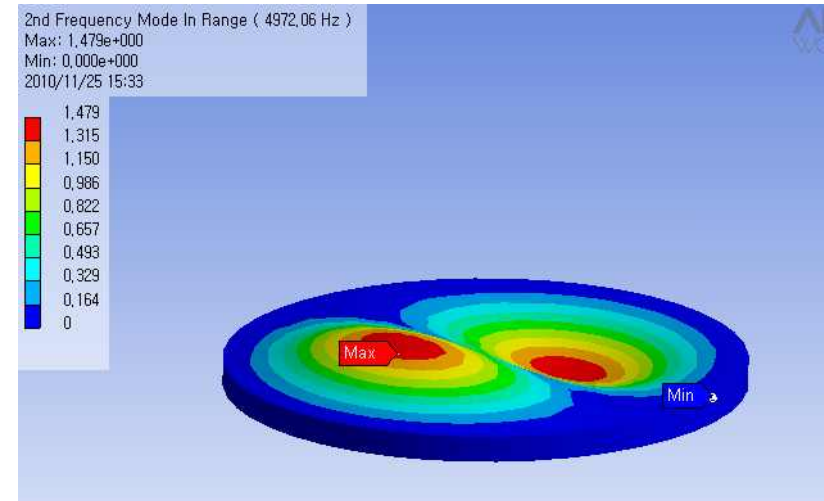
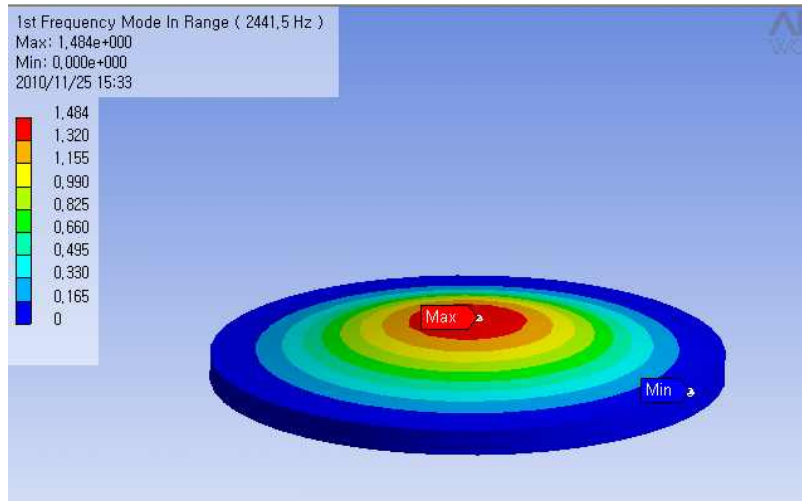
연습 3 (2)

❖ 경계조건



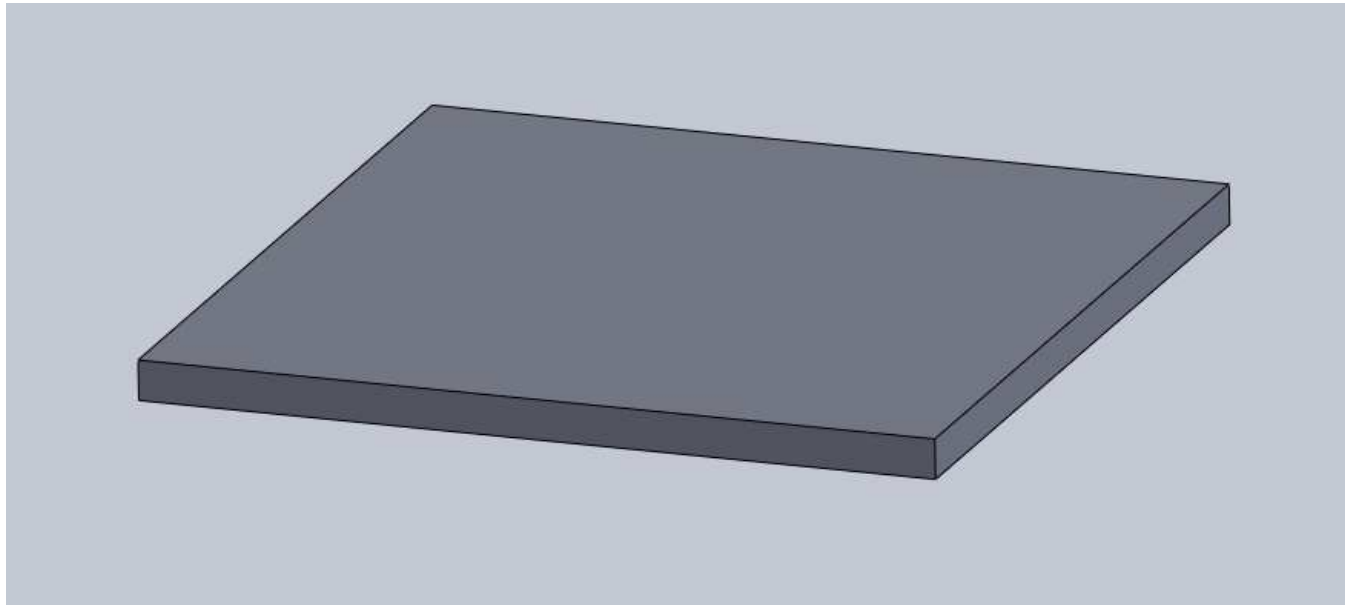
연습 3 (3)

❖ 해석 결과



연습 4 (1)

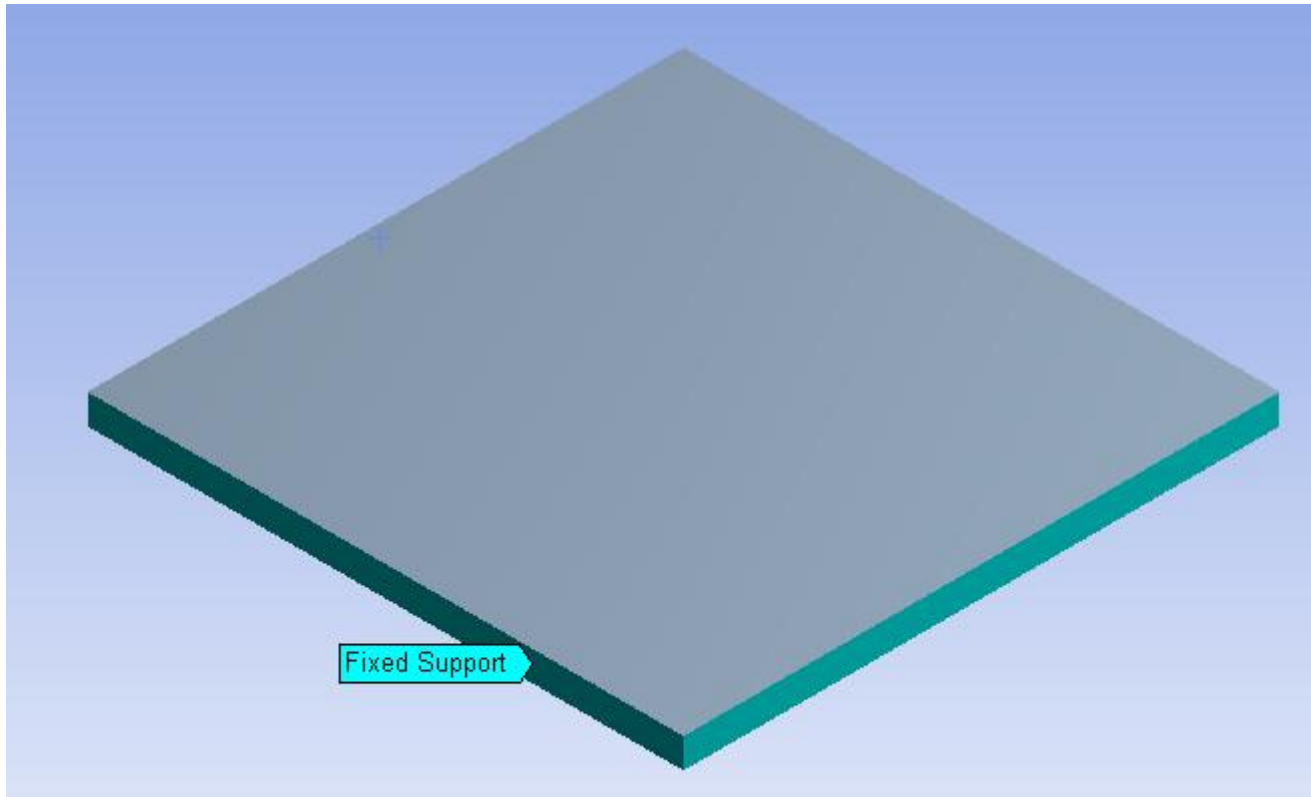
❖ 사각 판의 고유진동수 및 모드 형상



- 형상 : 가로 0.2 m, 세로 0.2 m, 높이 0.01 m
- 물성치 : 탄성계수 200 GPa, 포아송 비 0.32, 밀도 8,200 kg/m³
- 경계조건 : 테두리 고정(fixed)

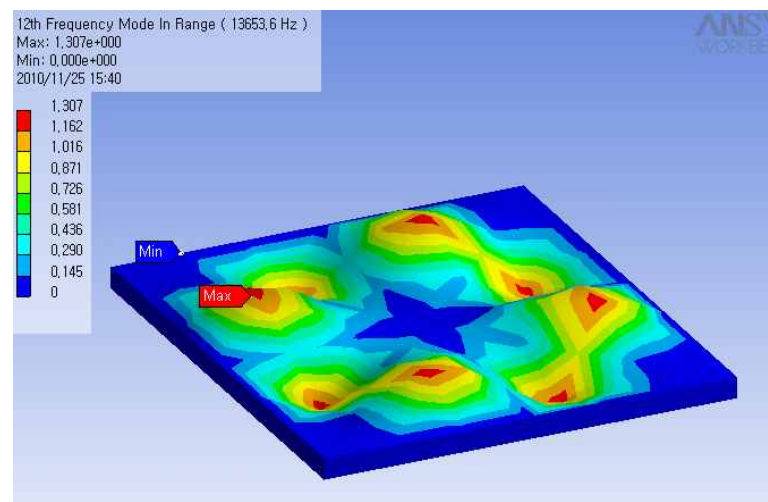
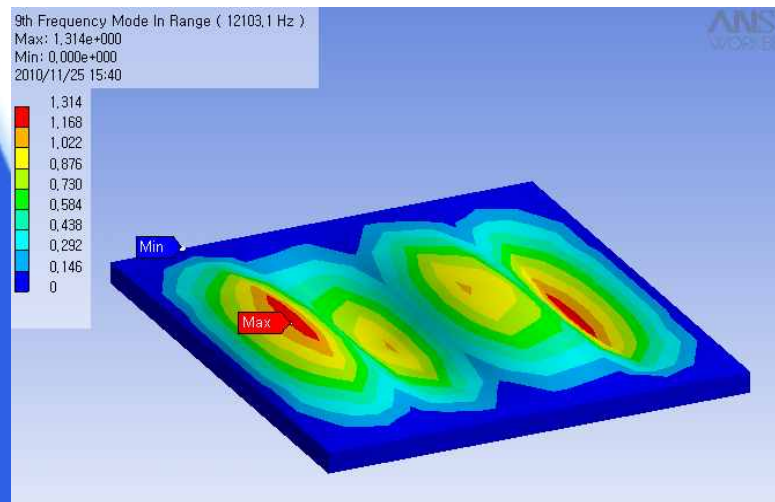
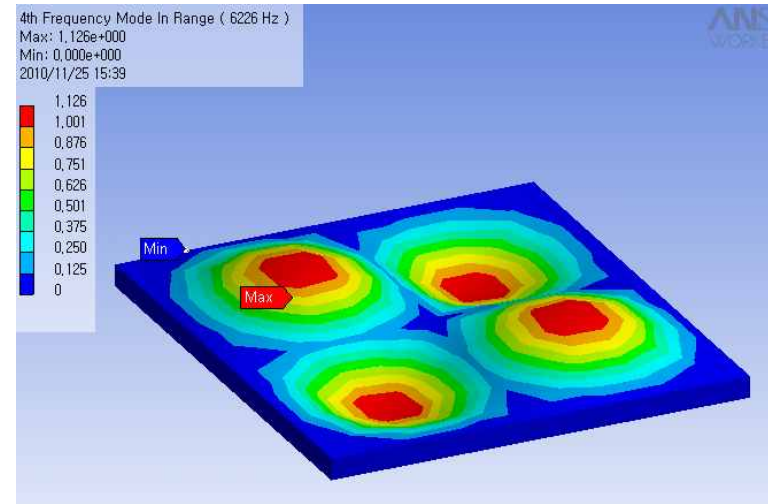
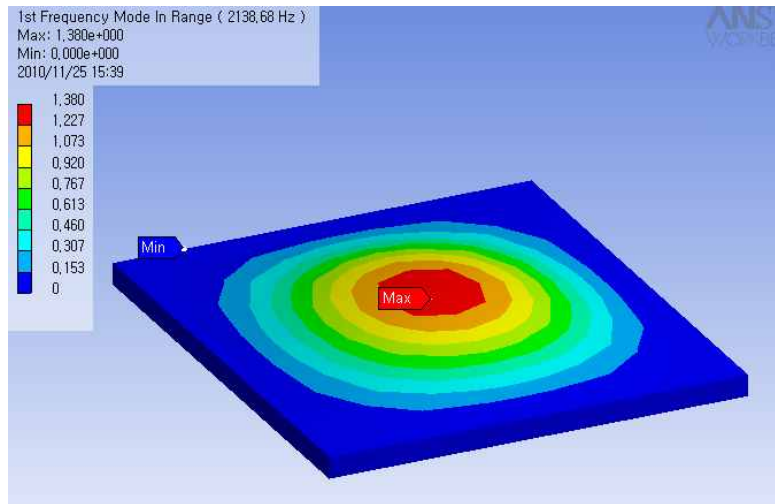
연습 4 (2)

❖ 경계조건



연습 4 (3)

❖ 해석 결과



요 약

ANSYS의 구성

ANSYS 해석 연습

1. 외팔보

2. 양단 고정 보

3. 원형 판

4. 사각 판