

Atir Software Development LTD

# STRAP - Space Shell

## Verification

All rights, including those of translation, are reserved.

No portion of this document may be reproduced, including photocopying without a written permission from Atir Engineering software LTD.

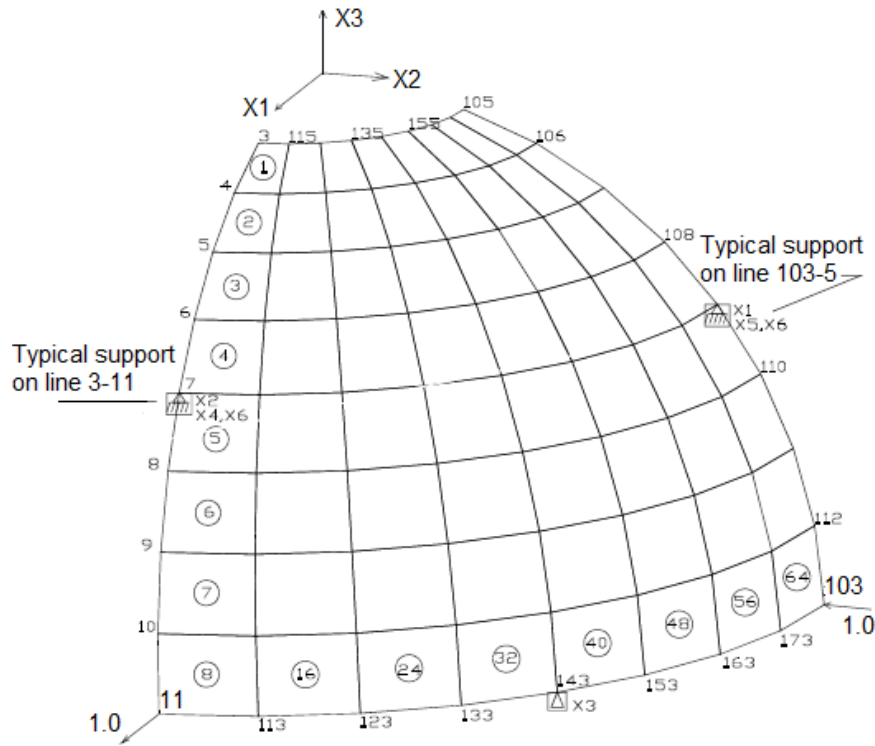
© Atir Engineering software LTD  
13 Kehilat saloniki, Tel Aviv, Israel  
Tel: +972-3-6480129  
Website: <http://www.atir.com>  
Email: [atir@atirsoft.com](mailto:atir@atirsoft.com)

## Table of contents

1. Description .....	3
2. Geometry.....	3
3. Loads.....	3
4. Reference .....	3
5. Calculations .....	4
6. Comparison of Results .....	4

## 1. Description

A hemispherical shell with an opening at its top is loaded with point loads along its edge. As the geometry and loading is symmetrical, only one-quarter of the shell is modeled.



## 2. Geometry

Elements: rectangular

Radius: 10.0

Thickness: 0.4

Modulus of Elasticity:  $6.825 \times 10^7$

Poisson ratio: 0.3

Supports: Symmetry supports along the side of the shell, a support for stability at the midpoint of the base.

## 3. Loads

- Concentrated load: 1.0 at node 11
- -1.0 at node 103

## 4. Reference

Richard H. Macneal, Robert L. Harder, *A Proposed Set of Problems to Test Finite Element Accuracy*, R.C. Finite Elements in Analysis and Design, North Holland, 1985.

## 5. Calculations

The reference gives 0.094 as the value for comparison of results.

## 6. Comparison of Results

Node	Result type	Result		Deviation
		Theoretical	STRAP	
11, 103	Deflection in the direction of load	0.094	0.0902	4.04%