

5. PRODUCT DESIGN AND MANUFACTURING REVIEW

Topics:

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Objectives:

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5.1 Introduction

5.2 Examples

5.3 Summary

5.4 References/Bibliography

5.5 Problems

F.E. Chapter 10 - Systems of Forces - Problems 1-23

F.E. Chapter 11 - Trusses - Problems 1-10

F.E. Chapter 12 - Pulleys, Cables, and Friction - Problems 1-12

F.E. Chapter 13 - Centroids and Moments of Inertia - Problems 1-18

F.E. Chapter 18 - Stress and Strain - Problems 1-18

F.E. Chapter 19 - Thermal, Hoop and Torsional Stress - Problems 1-18

F.E. Chapter 20 - Beams - Problems 1-15

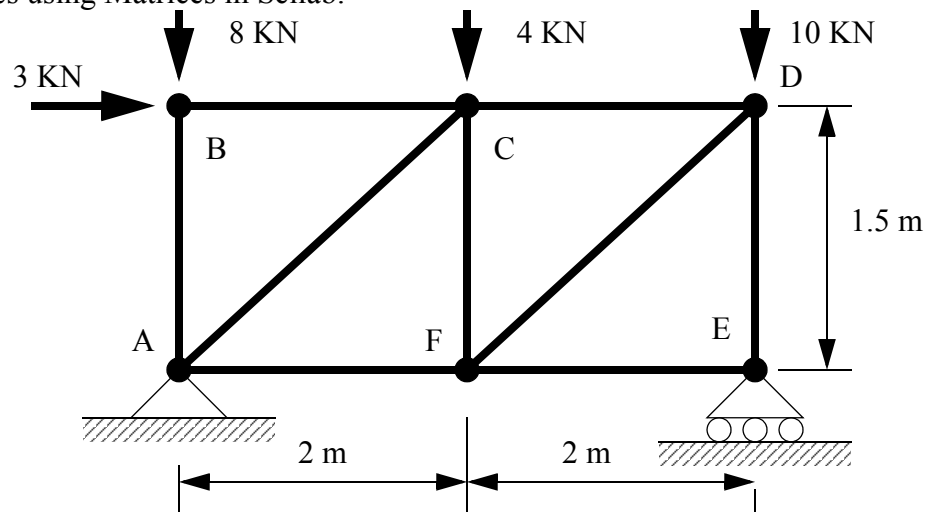
F.E. Chapter 21 - Columns - Problems 1-10

F.E. Chapter 36 - Crystallography and Atomic Bonding - Problems 1-8

F.E. Chapter 37 - Material Testing - Problems 1-11

F.E. Chapter 38 - Metallurgy - Problems 1-18

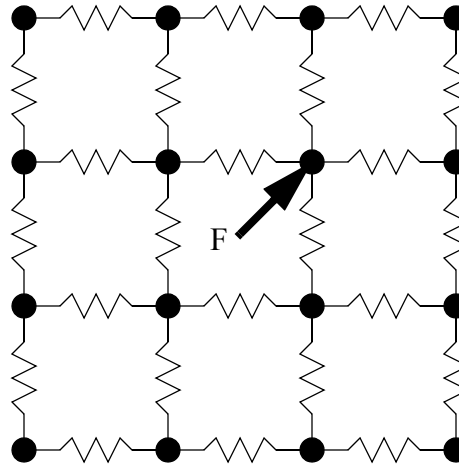
1. Find the forces using Matrices in Scilab.



5.6 Challenge Problems

1. Write a program to find the deformation of an array of springs (as pictured below) with a force applied to an internal node. Use a matrix method to solve the problem. Assume that the

nodes at the four corners are fixed and unable to move.



2. Write the differential equations for one of the following systems. Simulate the system response using a numerical method, such as Runge-Kutta integration.

