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Name \_\_\_\_\_

Section H J

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## Mathematics 1553

Written Homework 4

Prof. Margalit

19 February 2016

1. Consider the matrix

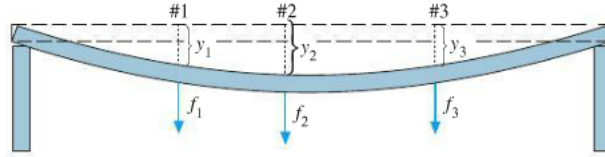
$$A = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

Compute all powers of  $A$ :  $A^2, A^3, \dots$

2. Let

$$D = \begin{pmatrix} .005 & .002 & .001 \\ .002 & .004 & .002 \\ .001 & .002 & .005 \end{pmatrix}$$

be a flexibility matrix with flexibility measured in inches per pound.



Suppose that forces of 20, 50, and 30 pounds are applied at points 1, 2, and 3 in the picture. Find the corresponding deflections.

Compute the stiffness matrix  $D^{-1}$ . List the forces needed to produce a deflection of .04 at point 3 and zero deflection at points 1 and 2.