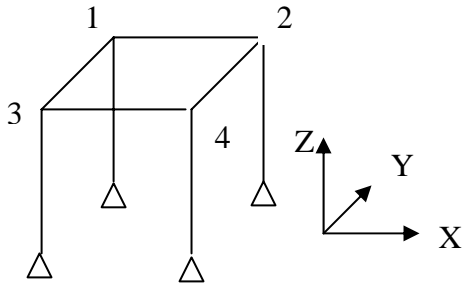**Jesse Belden**

Section 2.7 – Problem 7

We are given a space truss in the shape of a cube. The truss has 8 bars and the four bottom joints are fixed. Therefore,
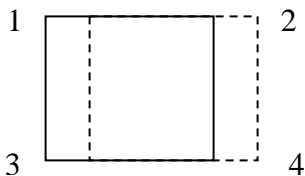
m = # of bars = 8
n = $3N - r$ = $3(8) - 12 = 12$

and thus the matrix A will be 8 x 12

We expect there to be n-m = 4 independent solutions to $Au = 0$. Because the truss cannot undergo any rigid body motions, the 4 independent solutions will all be mechanisms.

Note: General form of vector $u = (u_{1X}, u_{1Y}, u_{1Z}, u_{2X}, u_{2Y}, u_{2Z}, u_{3X}, u_{3Y}, u_{3Z}, u_{4X}, u_{4Y}, u_{4Z})$
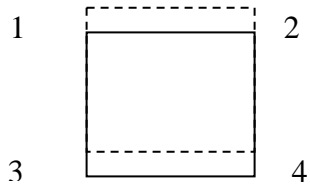
<u>**Mechanism 1**</u>

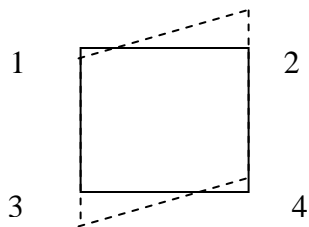Top view of truss:

$u = (1,0,0,1,0,0,1,0,0,1,0,0)$

Mechanism 2

Top view of truss:

1   2
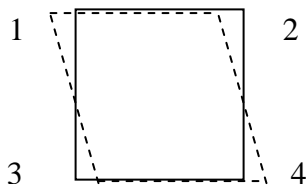
3   4

u = (0,1,0,0,1,0,0,1,0,0,1,0)

Mechanism 3

Top view of truss:

1   2

3   4

u = (0,-1,0, 0,1,0, 0,-1,0, 0,1,0)

Mechanism 4

Top view of truss:

1   2

3   4

u = (-1,0,0,-1,0,0,1,0,0,1,0,0)