# MATLAB Problem    FINAL ❓

ℹ️  The problem is saved as Final. It is now visible to learners when the course section is
published. To edit this problem, click Set to Draft.

required fields *

## Title * ❓

A 2D truss example (4 fundamental spaces of the B matrix)

## Problem Description and Instructions * ❓
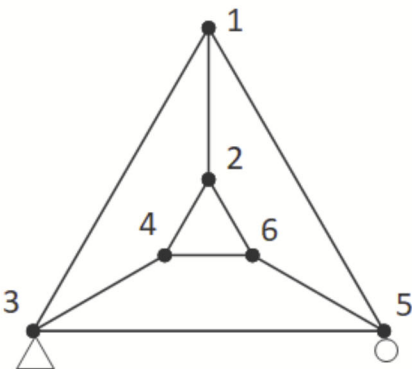
Normal ▼

TEXT                          CODE                    INSERT

This problem is a precursor to the actual assignment. Consider the truss below.



1. Deduce the number of internal mechanisms and assign it to the variable, `num_internal_mechanis`
2. Deduce the degree of static indeterminacy, and assign it to the variable, `static_indeterminacy`.

You can do these either by inspection, or by assembling the *B* matrix, and finding the dimension of the relev

If you choose to go the latter route, you are provided 3 functions to work with.

1. `[coord, connect, bcs] = getNestedTriangleTrussGeom(h,r)` that returns the joint coordina
   `h` is the height from the centroid of either triangle to joint 1; `r` is the ratio of the side of the inner trian
2. You can visualize the truss using the function `draw2DTruss` which has the same signature as `draw`
3. `B = getB(coord, connect, bcs)` returns the *B* matrix.

Also, if you go this route, you will find it illustrative to visualize the internal mechanisms (if any) using `draw2D`

# Files Referenced ❓

draw2DTruss.m (https://lcms-files.mathworks.com/content/file/26872887-a1d4-45dc-aae8-4b3982f4d54b/draw2DTruss.m?versionId=TQq_MVNVaimXNdGrwPGR31olzFvvMou0)

🗑

get2DtrussB.m (https://lcms-files.mathworks.com/content/file/82d1f582-2591-419d-bb83-c47284e78b11/get2DtrussB.m?versionId=LM0gv8hyTOxp1aucOydyrqPcMxlKgxK9)

🗑

getB.m (https://lcms-files.mathworks.com/content/file/d955f645-9ccc-4305-be01-eec122909d2a/getB.m?versionId=AIO63r0iZpQFtCkKFSQTvwA_RX80l1nC)

🗑

getNestedTriangleTrussGeom.m (https://lcms-files.mathworks.com/content/file/a17705f1-e75c-4cf3-9bd2-eb50da8c25e9/getNestedTriangleTrussGeom.m?versionId=MvfoccBF6zwpL5fMYFElQ_luULJ6BUl6)

🗑

[ + Add file ]

# Problem Type* ❓

⭕ Script    ⭕ Function

# Code

| **Reference Solution** ❓ | Learner Template ❓ |
| --- | --- |

```
1  [coord, connect, bcs] = getNestedTriangleTrussGeom(10, 0.25);
2  B = getB(coord, connect, bcs);
3
4  N = null(B);
5  num_internal_mechanisms = size(N, 2); % number of columns in the basis for the null
6
7  NT = null(B');
8  static_indeterminacy = size(NT, 2);
9
```

# Assessment* ?

Assessment Method:    [ Correct/Incorrect ▼ ] ?

☑ Only show feedback for initial error ?

---

**Test 1:** [ Number of internal mechanisms correct     ? ]     🗑

### Test Type

[ Variable Equals Reference Solution ▼ ] ?

### Variable Name You Want To Compare* ?

[ num_internal_mechanisms ]

### Feedback on Incorrect (in addition to default feedback) ?

[ Normal ▼ ]

| TEXT | CODE | INSERT |
| --- | --- | --- |
| | | |

☐ Pretest ?

**Tolerance:** This test allows for a small difference (+/- 0.1% relative, +/- 0.0001 absolute) between the learner solution and reference solution; for example, to account for different implementations of an algorithm. Learn more

Convert Test To Code

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**Test 2:** [ Degree of static indeterminacy correct     ? ]     🗑

### Test Type

[ Variable Equals Reference Solution ▼ ] ?

### Variable Name You Want To Compare* ?

static_indeterminacy

## Feedback on Incorrect (in addition to default feedback) ❓

Normal ▾

TEXT        CODE      INSERT

☐ Pretest ❓

**Tolerance:** This test allows for a small difference (+/- 0.1% relative, +/- 0.0001 absolute) between the learner solution and reference solution; for example, to account for different implementations of an algorithm. Learn more

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+ Add Assessment

Learner Preview      Validate Reference Solution

Set to Draft

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