**Analysis:**

When evaluating the displacements, U and V are normalized to PL/EA while 𝜃 is normalized to P/EA. Since the force is applied to node 5 in the negative y direction, node 5 has the highest displacement out of all nodes in the y direction. When evaluating EI = 0, I had to enforce a boundary at every node on the 𝜃 by setting it to a value of 0. If this is not done the matrix will be singular. Also as EI approaches 0, it seems that the element with nodes 3 and 5 has an axial force N that approaches 1 and hits exactly 1 at EI = 0.

Chart, line chart

Description automatically generated

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DOF** | **EI = 0.001EAL2** | **EI = 0.01EAL2** | **EI = 0.1EAL2** | **EI = 0 (Truss)** |
| **𝑢­1/(PL/EA)** | 0 | 0 | 0 | 0 |
| **v1/(PL/EA)** | 0 | 0 | 0 | 0 |
| **𝜃1/(P/EA)** | 0 | 0 | 0 | 0 |
| **𝑢­2/(PL/EA)** | 0 | 0 | 0 | 0 |
| **v2/(PL/EA)** | -0.87069 | -0.80712 | -0.47685 | -0.87847 |
| **𝜃2/(P/EA)** | -0.61332 | -0.53616 | -0.21466 | 0 |
| **𝑢­3/(PL/EA)** | -0.2039 | -0.15595 | 0.00568 | -0.21009 |
| **v3/(PL/EA)** | -3.15349 | -2.84388 | -1.42969 | -3.1921 |
| **𝜃3/(P/EA)** | -0.08947 | -0.10164 | -0.12357 | 0 |
| **𝑢­4/(PL/EA)** | 1.09042 | 0.9742 | 0.45139 | 1.10494 |
| **v4/(PL/EA)** | 0 | 0 | 0 | 0 |
| **𝜃4/(P/EA)** | 2.86415 | 2.59976 | 1.37234 | 0 |
| **𝑢­5/(PL/EA)** | 0.54202 | 0.45922 | 0.11678 | 0.55247 |
| **v5/(PL/EA)** | -4.63906 | -4.2128 | -2.23343 | -4.6921 |
| **𝜃5/(P/EA)** | -0.11336 | -0.12357 | -0.13669 | 0 |
| **Forces External** | **EI = 0.001EAL2** | **EI = 0.01EAL2** | **EI = 0.1EAL2** | **EI = 0 (Truss)** |
| **𝑢­1** | 0.38601 | 0.35044 | 0.18322 | 0.39043 |
| **v1** | 0.79168 | 0.78246 | 0.73924 | 0.79282 |
| **𝜃1** | 0.00867 | 0.07851 | 0.40728 | 0 |
| **𝑢­2** | -0.38601 | -0.35044 | -0.18322 | -0.39043 |
| **v2** | 0 | 0 | 0 | 0 |
| **𝜃2** | 0 | 0 | 0 | 0 |
| **𝑢­3** | 0 | 0 | 0 | 0 |
| **v3** | 0 | 0 | 0 | 0 |
| **𝜃3** | 0 | 0 | 0 | 0 |
| **𝑢­4** | 0 | 0 | 0 | 0 |
| **v4** | 0.20832 | 0.21754 | 0.26076 | 0.20718 |
| **𝜃4** | 0 | 0 | 0 | 0 |
| **𝑢­5** | 0 | 0 | 0 | 0 |
| **v5** | -1 | -1 | -1 | -1 |
| **𝜃5** | 0 | 0 | 0 | 0 |

**Rest of the values for EI = 0.001EAL2**

N for EI = 0.001EAL2

Text

Description automatically generated

V for EI = 0.001EAL2

Text

Description automatically generated

M1 for EI = 0.001EAL2

Text, chat or text message

Description automatically generated

M2 for EI = 0.001EAL2

Text

Description automatically generated

**Rest of the values for EI = 0.01EAL2**

N for EI = 0.01EAL2

Text

Description automatically generated

V for EI = 0.01EAL2

Text

Description automatically generated

M1 for EI = 0.01EAL2

Text

Description automatically generated

M2 for EI = 0.01EAL2

Text

Description automatically generated

**Rest of the values for EI = 0.1EAL2**

N for EI = 0.1EAL2

Text

Description automatically generated

V for EI = 0.1EAL2

Text

Description automatically generated

M1 for EI = 0.1EAL2

Text

Description automatically generated

M2 for EI = 0.1EAL2

Text

Description automatically generated

**Rest of the values for EI = 0**

N for EI = 0

Text

Description automatically generated

V for EI = 0

Text

Description automatically generated

M1 for EI = 0

Text

Description automatically generated

M2 for EI = 0

Text

Description automatically generated