

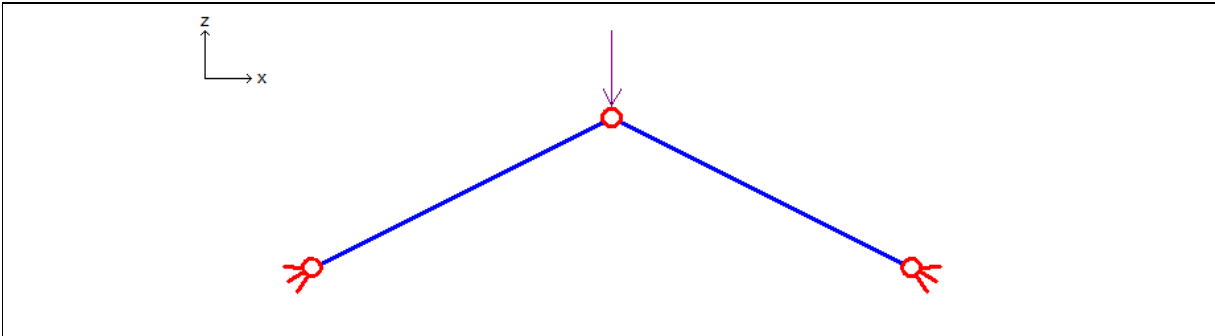
Validation of Sargon Nonlinear solver (CURAN, version 9.60)

TEST TR023

VALIDATION, RELIABILITY, BENCHMARK

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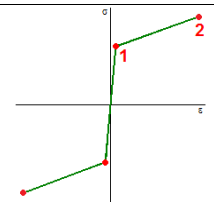


Test description

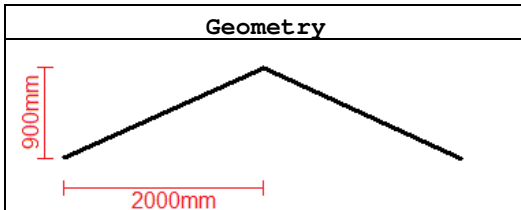
Constitutive law of trusses material: bilinear. Total load is divided in two different load cases. After second load case, f_y is exceeded.

Test model: **curanTR_023.WSR**

Material properties

| | | |
|--------------|----------------------|--|
| Name | S235BI |  |
| ν | 0,3 | |
| ϵ_1 | 0,001119 | |
| σ_1 | 235N/mm ² | |
| ϵ_2 | 0,02 | |
| σ_2 | 360N/mm ² | |

Cross-section: circular section, diameter=40mm (area=1256,64mm²)



Force (z direction)

| | |
|------------------------|--------------|
| Load case 1 | F = -150000N |
| Load case 2 | F = -150000N |
| Load path: active | |
| ..Total load: -300000N | |

CHECK

Situation caused by load case 1 + load case 2 should be equal to that in first load case of test 011, where a force equal to -300000N is applied. After case 1, normal stress in trusses should be half of the final normal stress (so, after case 1 yield stress is not exceeded yet).

| Load case | Value | Unit | CURAN | THEORETICAL | % diff. |
|-----------|--------------------------|-------------------|------------|-------------|---------|
| 1 | Truss #1 normal stress | N/mm ² | -1,454E+02 | -1,454E+02 | 0,00 |
| 2 | Truss #1 normal stress | N/mm ² | -2,909E+02 | -2,909E+02 | 0,00 |
| 2 | Node #8 displacement (z) | mm | 5,109E+01 | 5,111E+01 | -0,03 |

$$\% \text{ difference} = (\text{CURAN} - \text{THEORETICAL}) / \text{THEORETICAL} * 100$$

Precision of limit multiplier for the analysis: 0.005