

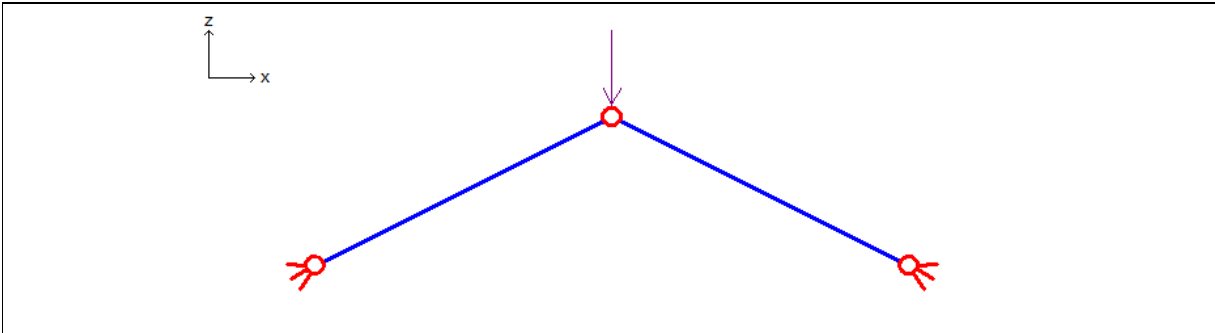
Validation of Sargon Nonlinear solver (CURAN, version 9.60)

TEST TR013

VALIDATION, RELIABILITY, BENCHMARK

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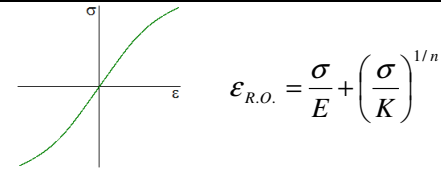


Test description

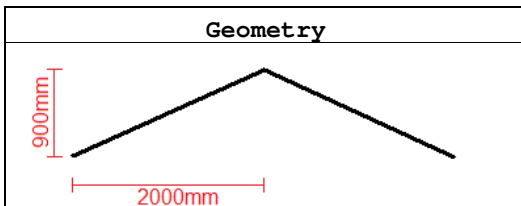
Constitutive law of trusses material: elastic defined by Ramberg-Osgood equation
 This case is similar to test 009, but here load path is active: it means that load case 2 is computed starting from final condition of load case 1.
 Constitutive law is elastic, is symmetrical and F_2 is equal to $-F_1$: the final condition after load case 2 should be with null deformations/displacements and null internal forces. Case 1 should coincide with case 1 of test 009.

Test model: **curanTR_013.WSR**

Material properties

| | | |
|------|-------------------------|---|
| Name | S235RO |  |
| E | 210000N/mm ² | |
| v | 0,3 | |
| K | 2000N/mm ² | |
| n | 0,2 | |

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



Force (z direction)

| | |
|-------------------|------------------|
| Load case 1 | $F_1 = -240000N$ |
| Load case 2 | $F_2 = +240000N$ |
| Load path: active | |

CHECK

| Load case | Value | Unit | CURAN | THEORETICAL | % diff. |
|-----------|--------------------------|------|------------|-------------|---------|
| 1 | Truss #1 axial force | N | -2,924E+05 | -2,924E+05 | 0,00 |
| 1 | Node #8 displacement (z) | mm | -6,036E+00 | -6,036E+00 | 0,00 |
| 2 | Truss #1 axial force | N | 5,722E-11 | 0,000E+00 | ~0,00 |
| 2 | Node #8 displacement (z) | mm | 1,332E-15 | 0,000E+00 | ~0,00 |

% difference = (CURAN - THEORETICAL) / THEORETICAL * 100

Precision of limit multiplier for the analysis: 0.005