

Homework # 4

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Truss Class

This class loads and analyze a 2D truss using the method of joints. If a third user input is given, then a plot is generated and saved in the specified file path.

Methods in Class:

- `__init__`
Initialize the instance.
- `parse_data`
Read joints.dat and beams.dat files from specified truss# directory.
- `compute_beamsxy`
Compute the components Bx and By of each beam force B1, B2, ..., etc., and store them in a dictionary.
- `compute_beamsPerJoint`
Store the intersecting beams per joint, and store them in a dictionary.
- `compute_sparsematrix`
Compute the sparse matrix in a csr matrix format.
- `solve_system`
Solve system of equations from sparse matrix (self.M) and known forces per joint (self.f).
- `PlotGeometry`
Compute the sparse matrix in a csr matrix format.

Type of sparse matrix: CSR sparse matrix where unknowns are the beams and the reaction forces specified by the joints.dat file.

Input and output arguments for each methods:

- **`__init__` class method:**
Two arguments
Argument 1: joints_file
Argument 2: beams_file
- **`parse_data` class method:**
No arguments
- **`compute_beamsxy` class method:**
No arguments
- **`compute_beamsPerJoint` class method:**
No arguments

- **compute_sparsematrix class method:**
No arguments
- **solve_system class method:**
No arguments
- **PlotGeometry class method:**
No arguments