An Interactive web app to visualize differential equations for beams and rods

Project Characteristics
Modeling: ★★★☆☆
Mathematics: ★★☆☆☆
Programming: ★★★★★
Science: ★★☆☆☆

Setting:

The differential equations of the bending beam theory are an essential topic in engineering education, but not always easily conceivable for students.
There already exists a framework for interactive web applications at the Chair of Structural Mechanics, where physical phenomena are visualized.
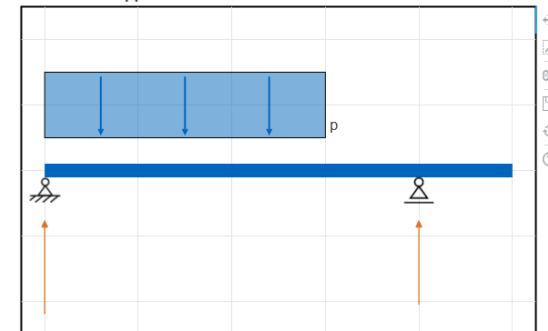
Your Tasks:

Create a web application that visualizes the differential equations for beam and rod systems with arbitrary geometry, boundary conditions, loading, cross sections, and material properties.
The user experience is a very important aspect of the project, as undergraduate students should be able to use it without further guidance.
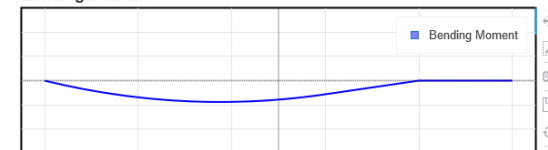
Beam with Supports and Load

Bending Moment

Shear Force