# MAE263F Homework 2

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***This report presents the simulation of an elastic rod under gravity using the Discrete Elastic Rods (DER) algorithm. The rod is modeled as a series of nodes connected by elastic elements that can bend, twist, and stretch. The physical behavior is simulated over time using an implicit time integration method to determine the effects of gravity on the deformation of the rod, including stretching, bending, and twisting. The z-coordinate of the last node is tracked throughout the simulation to assess the rod's deformed shape and the steady-state configuration under gravitational loading.***

## I. Introduction

This report presents the simulation of an elastic rod under gravity using the Discrete Elastic Rods (DER) algorithm. The rod is modeled as a series of nodes connected by elastic elements that can bend, twist, and stretch. The physical behavior is simulated over time using an implicit time integration method to determine the effects of gravity on the deformation of the rod, including stretching, bending, and twisting. The z-coordinate of the last node is tracked throughout the simulation to assess the rod's deformed shape and the steady-state configuration under gravitational loading. The purpose of this report is to analyze the deformation of an elastic rod under gravity using the DER algorithm. The rod is represented as nodes connected by elastic forces, allowing bending, stretching, and twisting. The implicit time integration ensures stability and accuracy. The simulation tracks the position of the last node to evaluate the rod's deformed configuration.

## II. Math

- *Problem 1*