Thesis Title	Large Deflections of a Variable-Arc-Length Beam Subjected to an Inclined Follower Force
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Abstract

This thesis deals with an investigation of large deflections of variable-arc-length beams under an inclined follower force. One end of the beam is hinged, while the other end portion is allowed to slide freely on a frictionless support. In the deformed configuration, arc-length of the beam is not constant but can be varied from the hinged end to the frictionless support. The follower force is applied at any distance from the hinged end. To solve this problem, two different approaches are used. The first approach is based on elastica theory and the exact closed-form solutions are obtained in the form elliptic integrals of the first and second kind. The set of equations of the problem is obtained from the boundary conditions and solved iteratively for the solutions. The shooting method is employed in the second approach in which the set of governing differential equations is numerically integrated using the Runge-Kutta algorithm. The results obtained from the two approaches are in very good agreement and almost identical.

From this study, it is found that if the follower force is inclined in direction to the hinged end, the beam has two equilibrium configurations; one is stable and the other is unstable. If it is inclined in direction away from the hinged end, the beam may have either one equilibrium configuration or two equilibrium configurations depending on the magnitude of inclination and position of the follower force.