



## BUCKLING OF A TAPERED COLUMN UNDER ITS OWN WEIGHT. (LECTURE 1)

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I shall begin by formulating the classical Euler-Bernoulli model for the buckling of a heavy tapered column under its own weight as a singular nonlinear Sturm-Liouville problem.

Then I shall review the work by Euler (c. 1780) and Greenhill (1881) on the linearized problem.

Next I shall summarize the contributions of Keller & Niordson (1966) and Cox & McCarthy (1998) to the problem of optimal design. This leads to a notion of critical tapering.

At this point we return to the nonlinear problem and the study of solutions which minimize the energy. The behaviour of the minimizers is related to the spectral theory of the linearized problem. Critical tapering coincides with the appearance of essential spectrum for the linearized problem.