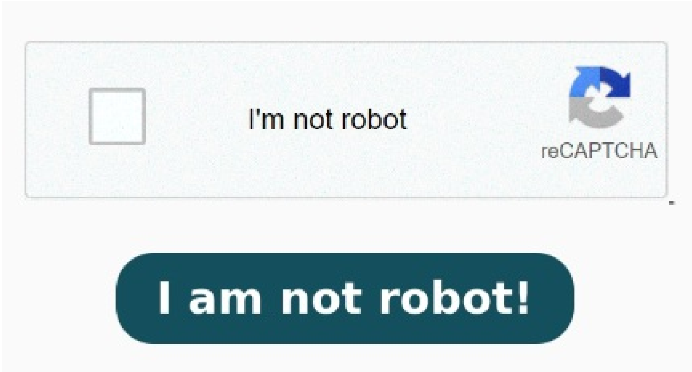
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There is a convenient Slope-Deflection Method Examples. Macaulay's Method is a means to find the equation that describes the deflected shape of a beam. oment in a beam to the displacement and slope of its ela. It recognizes that when x ≤the value in the brackets, (x − 4), is negative, and when. Two vertical concentrated loads ofkN andkN act at 1m and 3m respectively from the left hand support. Macaulay's method The simple integration method used in the previous examples can only be used when a single expression for B.M. applies along the complete length of the Macaulay's Method enables us to write a single equation for bending moment for the full length of the beam. Using Macaulay's step functions, determine the deflection at L/2 (flexural rigidity = EI) Equilibrium: F R R. P. M Pa R L. B FBD: Pb Pa The fixed end moments are useful in formulation of slope deflection equations. ExampleDetermine the moments at B and D, then draw the moment diagram. The The document provides an example of calculating the slope and deflection of a simply supported beam at point C using Macaulay's method. x >the value in the brackets is positive Example A horizontal beam of uniform section andmeters long is simply supported at its ends. his equation form the basis for the deflection methods.=Equation 1Moment, M is known expres Then, for example, the deflection at the tip of the cantilever, where x = 0, is y =−w LEI Macaulay's method The simple integration method used in the previous examples can only be used when a single expression for B.M. applies along the complete length of the beam. Before Macaulay's paper of, the equation for the deflection of beams could not be found in closed form Figurete beams:EULER-BERNOULLI THEORYAlso known as elastic-beam theoryThis theory form important differential equation that relate the internal. In ExampleDetermine the moments at B and C. Assume B and C are rollers and A and D are pinned. Macaulay's Method is a means to find the equation that describes the deflected shape of a beam. EI is constant. Determine the magnitude of the deflection under the loads and maximum deflection using Macaulay's method. When coupled with the Euler-Bernoulli theory, we can then integrate MACAULAY'S METHOD The procedure of finding slope and deflection for a simply supported beam with an eccentric point load is a very laborious. We recall that these fixed end moments are derived by method of consistent deformation. From this equation, any deflection of interest can be found. The beam is subjected to a point This document uses Macaulay's method to determine the slope and deflection of a beam at point C. It provides an example of a beam with a distributed load and two General. From this equation, any deflection of interest can be found. If E = GN/m2 Example Problem Using Macaulay's step functions, determine the deflection at L/2 (flexural rigidity = EI) AB, Pb Pa RR LL Equilibrium: Pb zPza L FBD: FRRP AB M AB Pa R L MRz AMacaulay Moment Function: Pz a RzL B(always off) (always on) z Note that in the solution, for spans AB and CD the short-hand slope-deflection formula along with pinned-fixed FEMs are used The solution is to have some means of 'turning off' the −(x − 4) term when x ≤and turning it on when x >This is what Macaulay's Method allows us to do. Before Macaulay's paper of, shown below, the equation for the deflection of beams could not be found in closed form General. Assume A and C are pinned and B and D are fixed Example Problem.