

# THE ADAPTIVE NUMERICAL MODEL OF A GIRDER ON ELASTIC BASE

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**Abstract:** This paper presents the Adaptive Fup Collocation Method (AFCM) for 1D numerical solving of the problem of bending of a continuous girder on an elastic base. The method is based on the collocation procedure by using Fup basis functions that belong to the class of atomic basis functions. Because of the localization of basis functions, the method develops load, solution and all their derivatives in a multiresolutional way representing all necessary frequencies. Girder is modeled using elastoplastic material, and the nonlinearity in the contact of girder and base is taken into account. Results show that the accuracy of the numerical solution is determined by the selected deviation by which the method accuracy and its analytical characteristics are presented. The solution is described by the adaptive position of collocation points (adaptive grid) that, in addition to presenting significant frequencies and spatial scales, provides minimum spatial discretization and efficiency of the numerical procedure. A large number of collocation points are necessary only in zones of concentrated forces, plasticization, bearings or high displacement gradients and its derivatives.

**Key words:** adaptive collocation procedure, nonlinear model, girder on elastic base, Fup basis functions, multiresolution numerical procedure.



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