

Bolotin's reduce beam model for various boundary conditions

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Abstract: This paper is devoted to the construction of asymptotically correct simplified models of nonlinear beam equations for various boundary conditions. V.V.Bolotin mentioned that in some cases (e.g., if compressed load is near the buckling value) the so-called „nonlinear inertia“ must be taken into account. The effect of nonlinear inertia on the oscillations of the clamped-free beam is investigated in many papers. Bolotin used some physical assumption and did not compare order of nonlinear terms in original equations. Below we propose our way for obtaining this equation, which we will name „Bolotin equations“. This approach is based on fractional analysis of original boundary value problems.

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