Accounting the highest tones of oscillations when calculating the sensitivity of modes of their own to variations in the parameters of a mechanical system

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The article proposes the method for calculating the derivatives of numbers of their own and eigenvectors in a symmetric generalized eigenvalue problem in parameters of a mechanical system. Expansion in series of modes of their own is applied to calculate the derivatives forms of their own. The convergence of these series is investigated. The paper shows that the number of terms of the series turns out to be quite large for achieving an acceptable accuracy (in 1%). Formulas for the approximate accounting of the sum of all discarded terms are found from the analysis of the coefficients of the series. The solution of the auxiliary problem of the statistic loading of a mechanical system by a certain force vector is required for this, therefore the correction is called static. Accounting for it allows us to drastically reduce the number of terms of the series, providing acceptable accuracy.

Keywords: *frequency of vibration, vibration mode, generalized eigenvalue problem, final element method, sensitivity, hardness, mass, expansion in series, convergence of series*

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