ROTATING VECTORS OF 2-DEGREE-OF-FREEDOM OSCILLATION

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Abstract

The 2-Degree-of-Freedom oscillation system has a great importance in the fields of dynamic vibration reduction and of metamaterials. Mainly the research of metamaterials has gathered momentum recently, since the protection against vibration with smart materials has become a highly important research project worldwide. The aim of this paper is to introduce the analytical solving process of the linear 2-Degree-of Freedom oscillation with rotating vectors. The author found that the rotating vector method was used only for description of 1-Degree-of Freedom oscillation, so that has been improved for 2 masses with linear characteristic springs and viscous dampers with periodic excitation. Relationship between the phase shift and the amplitudes of the two masses' motion has been revealed. Both depend on only the frequency rate and the Lehr's damping ratio. A $G_{21} = A_2/A_1$ modulus has been introduced and called amplitude rate. Furthermore the influence of non-linear parts is also presented shortly on the basis of numerical calculation.

Key words: rotating vectors, 2-degree-of-freedom, phase shift, amplitude rate