

BOOK OF ABSTRACTS

Mo.G-P20 - Division and multiplication of a ferromagnetic resonance frequency on the basis of the nonlinear microwave magnetoelastic transducer

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The coupled oscillations of magnetization and elastic displacements in normally magnetized ferrite plate excited by the alternating magnetic field which frequency coincides with the frequency of a ferromagnetic resonance of a magnetic subsystem [1] are considered. When the resonant frequency of an elastic subsystem makes multiple part of resonant frequency of a magnetic subsystem, the excitation of elastic oscillations at the elastic resonance frequency represents process of division of initial frequency in the multiple relation is possible. When the resonant frequency of an elastic subsystem in multiple number of times exceeds frequency magnetic the multiplication of initial frequency in the multiple relation is possible. Processes of the division and multiplication of frequency are possible only in strongly nonlinear mode, and polarization of an exciting field has to be linear for the multiplication. Phase portraits of the excited elastic oscillations are constructed at division and multiplication cases. It is shown that the division and multiplication are observed only in that case when time of a relaxation of elastic oscillations not less than much exceeds time of a relaxation of the magnetic oscillations.

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References:

1. V.S. Vlasov, L.N. Kotov, V.G. Shavrov, V.I. Shcheglov // Journal of Communications Technology and Electronics. 2009. V.54. No.7. P.821