First Order Time-varying Filters With a Periodically Variable Coefficient

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Abstract

Systems with time-varying parameters (LTV) are a direct generalization of linear and stationary systems. Many theoretical works [1] and practical applications [2] have been devoted to these system. In particular, among various applications of LTV filters one can list signal processing [3,6], acoustics [5], telecommunication [6], medicine [4] and others. The article is devoted to modeling and analysis of properties of analogue and digital LTV filters with periodically variable coefficients. The transmission model of filters has been described. Dependencies expressing the filter's response to monochromic, periodic and non-periodic excitation have been obtained and presented in a closed form. The analysis of filter properties in the frequency domain has been carried out. The filter has been treated as an input signal spectrum converter. The analogue and digital realizations have been proposed. The results have been illustrated by examples in a form of simulations. The experimental results of the realization of the filter have also been described using a digital processor.

References

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