

A NEW CONCEPT OF FILTERS FOR BIOMEDICAL DATA PROCESSING NEEDS

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Abstract

This paper presents a new class of filters that can meet biomedical signal processing needs. The paper is written in a technical note style, therefore, the proposed filters are not discussed with respect to a specific problem appearing in processing of a particular biosignal. The class of filters presented in this note should be treated as a new effective tool which can be applied to many cases of biomedical signals, especially when the processing time is very important. Nevertheless, a simple example of biomedical signal filtering is presented. This paper presents a new concept of continuous-time Butterworth filters whose parameters are varied in time. Thanks to the variation of the filter parameters, the time-varying filter response is considerably faster in comparison with the traditional time-invariant filters. Therefore, we can measure and register a lot of details in the initial stage of signal duration, which is not possible in the case of traditional time-invariant filters due to their long-lasting transients. Results verifying the effectiveness of the proposed filters are presented and compared to the traditional time-invariant filter structures.

Keywords: signal processing, data smoothing, biomedical signals, transient state, time-varying systems