

Colloquium  
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Change-point detection for non-stationary time series  
via complexity of functions and its applications to EEG  
data

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Refreshments 10:00am  
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Abstract

In many applications time series are sequences of connected, distinct segments which are generated by their own individual mechanisms. To analyze such series it is necessary to split them into these segments. If time series is generated by stochastic mechanisms, then the classical change-point detection algorithm can achieve the segmentation. However it is not the case for deterministic or mixed mechanisms.

We propose a novel approach to this problem based on a new concept of the complexity of a continuous function. We show that the dependence of the complexity of a function on the reconstruction error can be well approximated in logarithmic coordinates by an affine function. Its parameters, calculated dynamically, are then used as diagnostic sequences to find the change-points of the original time series. We verify the effectiveness of this procedure in the case of several simulated time series and apply this approach to the EEG data. (Joint work with B. Darkovsky)