INFORMATION TECHNOLOGY OF RECURRENCE ANALYSIS OF TIME SERIES

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In recent years the attempts at the information systematization have led to the nonlinear analysis of the time series. Analytical methods of time series play an important and direct role in obtaining quality results. The development of the nonlinear dynamics and chaos theory reinforced the nonlinear gist understanding of natural phenomena. Chaotic systems gaining interest, the analysis of such systems can be difficult. Traditional analytical methods impose restrictions that are usually difficult to overcome. The recurrence plot is the method imposing no such restrictions.

The recurrence plots method was introduced for the display and the recognition of the trends in time series data of complex dynamic systems. The analysis of such structures can provide understanding of nature processes. The latter occur in all dynamic systems and always have mathematical basis.

The recurrence plots are a new tool for analyzing complex dynamic systems which progresses dynamically. Diagrams visualize the multidimensional phase space even in the case of short and non-stationary data, and the type of geometric structure can verify the evolution in time of the selected process. Such graphical instrument allows you to see a dynamic picture in general. The visualization by recurrence plots is efficient, because it analyzes a typical activity and extends the field of study. Such visualization can help in the process of decision making by explaining the data; it helps to draw conclusions.

Recurrence plots are a new method for the qualitative explanation of time series. Recurrence plots can show the hidden graphical regulatory and structural changes in the data or similar regularities by studying and researching time series. Recurrent plots are one of the most interesting modern methods that obtained the theoretical development and the practical usage in the last decade.

Keywords – nonlinear dynamic, time series, recurrence plots.