Cover letter

31 July 31, 2018

Dear Professor Procaccia,

On behalf Jürgen Kurths, we would like to submit for the review paper entitled with "Complex network approaches to nonlinear time series analysis".

The abstract of the review paper is below:
In the last 10 years, there has been a growing body of literature addressing the utilization of complex network methods for the characterization of dynamical systems based on time series. While both nonlinear time series analysis and complex network theory are widely considered to be established fields of complex systems sciences with strong links to nonlinear dynamics and statistical physics, the thorough combination of both approaches has become an active field of nonlinear time series analysis during the last decade, which has allowed addressing fundamental questions regarding the structural organization of nonlinear dynamics as well as the successful treatment of a variety of applications from a broad range of disciplines. In this report, we provide an in-depth review of existing approaches of time series networks, covering their methodological foundations, interpretation and practical considerations with an emphasis on recent developments. After a brief outline of the state-of-the-art of nonlinear time series analysis and the theory of complex networks, we focus on three main network approaches, namely, phase space based recurrence networks, visibility graphs and Markov chain based transition networks, all of which have made their way from abstract concepts to widely used methodologies. These three concepts, as well as several variants thereof will be discussed in great detail regarding their specific properties, potentials and limitations. More importantly, we emphasize which fundamental new insights complex network approaches bring into the field of nonlinear time series analysis. In addition, we summarize examples from the wide range of recent applications of this methods, covering rather diverse fields like climatology, fluid dynamics, neurophysiology, engineering and economics, and demonstrating the great potentials of time series networks for tackling real-world contemporary scientific problems. The overall aim of this report is to provide the readers with the knowledge how the complex network approaches can be applied to their own field of real-world time series analysis.

Enclosure:
Manuscript
Copyright permission

Declarations of interest: none.

We sincerely apologize the delay for the submission. In case of any question or comment, please do not hesitate to contact us.

Yours sincerely,
Yong Zou, Reik V. Donner, Norbert Marwan, Jonathan F. Donges, and Jürgen Kurths

Contact details:
Yong Zou, yzou@phy.ecnu.edu.cn
Department of Physics
East China Normal University
Dongchuan Road 500
200241 Shanghai, China