The influence of noise on synchronization effects

Mariam martiashvili[a] *, Oleg kharshiladze* [ab]

e-mail:: Mariam.martiashvili971@ens.tsu.edu.ge

[a] Ivane Javakhishvili Tbilisi State University, Faculty of Exact and Natural Sciences 0128, I. Chavchavadze Avenue 1, Tbilisi, Georgia

[b] Mikheil Nodia Institute of Geophysics, Aleksidze str.1 Tbilisi, Georgia

Synchronization is a coordinated sequence of events necessary for the components of a system to function in harmony. In this report, we investigate the phenomenon of synchronization in the context of a nonlinear oscillator, specifically the Van der Pol oscillator. The Van der Pol oscillator is a self-oscillating nonlinear system that exhibits nonlinear oscillatory behavior in the absence of an external force. This report explores the synchronization effect when an external harmonic force is applied to the Van der Pol oscillator. Additionally, the synchronization effect is examined in a two-link oscillatory system. Furthermore, phase synchronization, as described by the Adler equation, is analyzed. The Adler equation is studied under the influence of one and two external periodic forces with different frequencies. Finally, the synchronization effect is investigated in the presence of noise.

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References

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