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Dynamical Properties of Neuromorphic Josephson Junctions

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Neuromorphic computing exploits the dynamical analogy between many physical systems and neuron biophysics. Superconductor systems, in particular, are excellent candidates for neuromorphic devices due to their capacity to operate in great speeds and with low energy dissipation compared to their silicon counterparts. In this study we revisit a prior work on Josephson Junction-based "neurons" in order to identify the exact dynamical mechanisms underlying the system's neuron-like properties and reveal new complex behaviors which are relevant for neurocomputation and the design of superconducting neuromorphic devices. Our work lies at the intersection of superconducting physics and theoretical neuroscience, both viewed under a common framework, that of nonlinear dynamics theory.

References

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