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Interspike Interval dynamics in neuronal populations | Luca Falorsi

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Abstract: We investigate the joint evolution of time from last spike and membrane potential in a recurrent network of integrate-and-fire neurons using a population density dynamics framework. This approach leads to a two-dimensional partial differential equation describing the system's dynamics, alongside a hierarchy of equations governing the moments of the time from last spike distribution. These results allow us to analyze the time evolution of the interspike interval distribution when the population significantly deviates from the stationary state, such as in the presence of limit cycles or time-varying external stimuli.

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