LOCAL ASYMPTOTIC NORMALITY FOR STOCHASTIC HOGDKIN-HUXLEY-SYSTEMS

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LAN; Hodgkin-Huxley; degenerate diffusion processes; periodic input:

We consider a stochastic Hodgkin-Huxley-system driven by a deterministic periodic signal that is distorted by Ornstein-Uhlenbeck-type noise. The signal depends on a d-dimensional shape-parameter ϑ and on a parameter T governing its periodicity. Observing the membrane potential over a long time interval, we show that statistical models for fixed starting point (of the whole $5d$ system) have the LAN property jointly in ϑ and T. The local scale turns out to be $n^{-1/2}$ for the shape parameter and $n^{-3/2}$ for the periodicity.

References

[1] Höpfner, R., Löcherbach, E., Thieullen, M. (2015) *Ergodicity and limit theorems for degenerate diffusions with time periodic drift. Applications to a stochastic Hodgkin-Huxley model*, arXiv:1503.01648.