

Detection of dependence between neurons and synchronization .

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Synchronisation is an important phenomenon in neuroscience, and this kind of dependency between neuronal activity may play an important role for how the brain encodes information. An essential mathematical/statistical question is therefore how to detect such phenomena in a setup where the observations are scarce, noisy and always fluctuating.

The Unitary Events methods will be described (first introduced by Grn in the 90's) which makes rigorous the distinction between synchronization and pure coincidence and how statistical testing procedures can distinguish between them.

The notion of local independence between the spiking activity of neurons and how estimating a graph of local independence can infer functional connectivity will be explained.