STRUCTURAL ASPECTS

1.1 DEGREE DISTRIBUTION

The in- and out-degree of vertex in a directed graph describes the number of incoming and outgoing connection from and to other vertices. As a fundamental for the categorization of graph types (scale-free) the degree distribution of a network is .

In networks .

The role of degree distributions in cortical circuits (Roxin 2011).

Clearly, (cf. Definition **??**).

having to simultaneously remains an open task. Biologically difficult to extract degree distribs (Perin). It is therefore . We note, however, two important questions should be answered here. First we test whether anis The anisotropic no difference to distance dependent (Figure 1.1). However, long tailed in comparison to random graph (Figure 1.2).
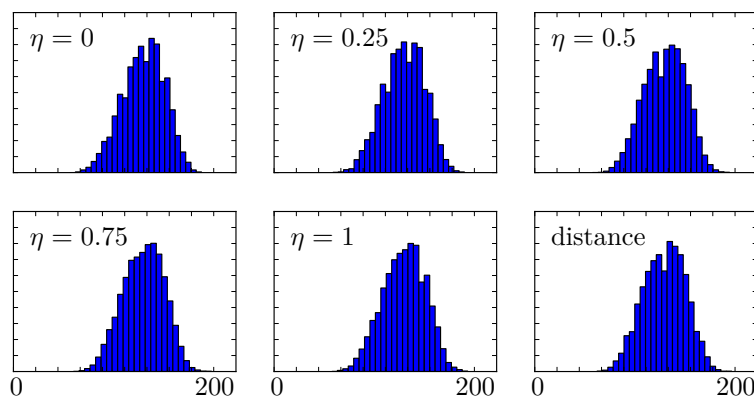

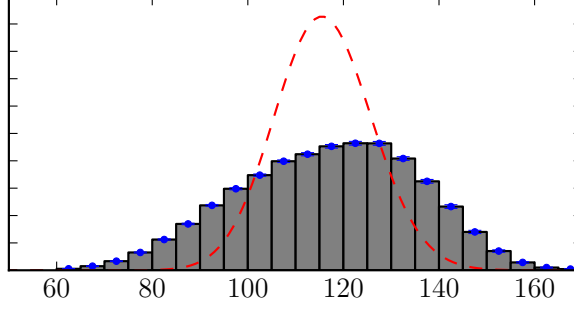**Figure 1.1: In-degree distribution in anisotropic**

Figure 1.2: In-degree distribution in anisotropic networks the binomial distribution of Gilbert random graphs From 250 anisotropic networks in-degree distributions were extracted and are shown in a histogram plot, errorbars SEM. In red the binomial degree distribution of a Gilbert random graph model with matching parameter set (number of vertices, connection probability) shows . Skewness is (`9326138e`)

While the out-degree distribution of vertices in the anisotropic network also shows itself stable under rewiring, its distribution is drastically different from the out-degree distribution in a comparable distance-dependent network (Figure 1.3). The asymmetric, long-tailed distribution is identified as an artifact of the anisotropic network's boundary, in which a neuron, closely located near the surface edge, might have an axon projection out of the square, causing mininal out-degree or projecting through the entire length of the surface, resulting in a maximal out-degree of $s\sqrt{2}$ on the

$$N\frac{ws\sqrt{2}}{s^2} = N\frac{w}{s}\sqrt{2} \approx 350$$
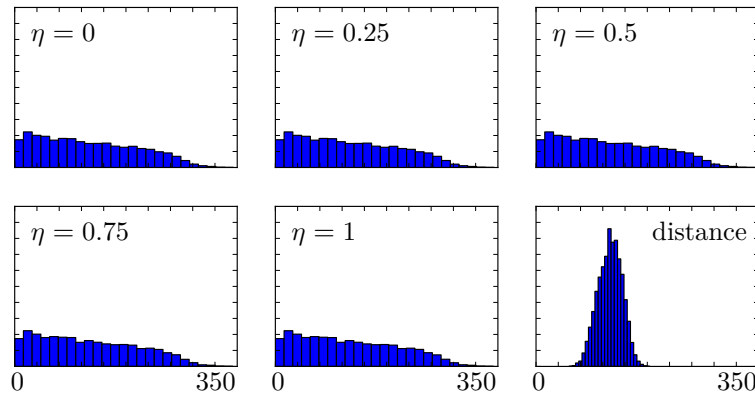
with $N = 1000$ and $\frac{w}{s} = 0.252$.

Figure 1.3: Out-degree distribution is does not artefact of boundary conditions
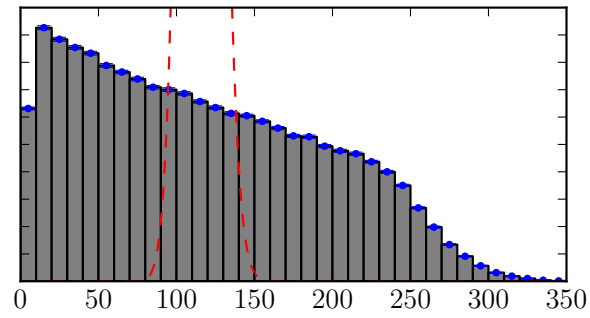
Figure 1.4: s The incline at the beginning is only barely visible due to the choice of bin size. Supplementary figures (**??**) (019555b0)

1.2 SMALL WORLD PROPERTIES

Sporns papers

1.3 MOTIFS

BIBLIOGRAPHY

Roxin, Alex (2011). The Role of Degree Distribution in Shaping the Dynamics in Networks of Sparsely Connected Spiking Neurons. *Frontiers in Computational Neuroscience* 5. DOI: `10.3389/fncom.2011.00008`.

Symbol	Description
L	Length
Ma	Mach number
p	Pressure

L