Potential Model

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The problem is formulated as follows: $\mathscr{G}_n = (V, X, Y, Z)$ where as defined in class V is the set of all nodes with edges, $X = (0,1)^{n\times n}$ and $Y = (0,1)^n$ describing the excitatory or inhibitory nature of the neuron. Z represents the orientation of the neuron discretized into four equally spaced regions starting from 0 degree to 180 degrees. $SBM_n^k = (\rho(z), \beta(z))$.

1 Potential Model of $\mathscr{Z}$

The simplest model of $\mathscr{Z}$ would a uniform distribution that assigns equal probability to the four regions from 0 degree to 180 degrees. It seems that a more educated distribution can be constructed, however infeasible, by characterizing the actual orientation of all the neurons *in vivo*.

2 Potential Structure of $\rho(z)$ and $\beta(z)$

As described in class, $\rho \in \Delta_k$ and $\beta \in (0,1)^{k\times k}$. The simplest distribution for β would be a Bernoulli distribution. The model proposed above has no dependence on the orientation of the neurons. In the respect to the graph being studied, this would not be a useful model as we initially assumed that the connectivity of the graph has an inherent dependence on the orientation of the neurons.