Chapter 2 - Probability Distributions

5. Nonparametric Methods

$$p_i = \frac{n_i}{N\Delta_i}$$

5.1. Kernel density estimators

$$\mathrm{Bin}(K|N,P) = \frac{N!}{K!(N-K)!}P^K(1-P)^{1-K}$$

$$p(\mathbf{x}) = \frac{K}{NV}$$

$$k(\mathbf{u}) = \begin{cases} 1, & |u_i| \leqslant 1/2, \quad i = 1,\ldots,D, \\ 0, & \text{otherwise} \end{cases} \qquad \begin{aligned} k(\mathbf{u}) &\geqslant 0, \\ \int k(\mathbf{u})\,\mathrm{d}\mathbf{u} &= 1 \end{aligned}$$

$$p(\mathbf{x}) = \frac{1}{N}\sum_{n=1}^{N}\frac{1}{h^D}k\left(\frac{\mathbf{x}-\mathbf{x}_n}{h}\right)$$

$$p(\mathbf{x}) = \frac{1}{N}\sum_{n=1}^{N}\frac{1}{(2\pi h^2)^{1/2}}\exp\left\{-\frac{\|\mathbf{x}-\mathbf{x}_n\|^2}{2h^2}\right\}$$

5.2. Nearest-neighbour methods