- If we assume that $p(\mathbf{x})$ is continuous and $\mathcal{R}$ is small enough so that $p(\mathbf{x})$ does not vary significantly in it, we can get the approximation

$$\int_{\mathcal{R}} p(\mathbf{x}')d\mathbf{x}' \simeq p(\mathbf{x})V$$

  where $\mathbf{x}$ is a point in $\mathcal{R}$ and V is the volume of $\mathcal{R}$.
- Then, the density estimate becomes

$$p(\mathbf{x}) \simeq \frac{k/n}{V}.$$