

$$pf: f(x) = \sum_{i=1}^n w_i \delta(x - x_i)$$

$$\hat{x}_k^+ = E(X) = \int_{-\infty}^{+\infty} \sum_{i=1}^n w_i \delta(x - x_i) dx = \sum_{i=1}^n w_i x_i$$

$$\begin{aligned} D(X) &= E(X^2) - [E(X)]^2 = \int_{-\infty}^{+\infty} x^2 f(x) dx - \left(\int_{-\infty}^{+\infty} x f(x) dx \right)^2 \\ &= \sum_{i=1}^n (w_i x_i^2) - (\hat{x}_k^+)^2 \end{aligned}$$