

kT_2 ~~normalization~~ $\int_{-\infty}^{+\infty}$

$$\begin{aligned}
 M\{x\} &= \int_{-\infty}^{+\infty} x \cdot p(x) dx = \int_{-\infty}^{+\infty} x \cdot 0 \cdot dx + \int_0^{+\infty} x \cdot e^{-x} dx = \\
 &= \int_0^{+\infty} x \cdot e^{-x} dx = - \int_0^{+\infty} x \cdot d(e^{-x}) = \left[- \left[x \cdot e^{-x} \right]_0^{+\infty} - \int_0^{+\infty} e^{-x} dx \right] \\
 &= - \left[0 - 0 + e^{-x} \Big|_0^{+\infty} \right] = - \cancel{0} (0 - 1) = 1
 \end{aligned}$$

$$M_{\xi}^2 = \int_{-\infty}^{+\infty} x^2 p(x) dx = \int_{-\infty}^{+\infty} x^2 \cdot \text{[scribble]} dx \text{ [scribble]} +$$

$$\text{[scribble]} \int_{-\infty}^{+\infty} x^2 d(e^{-x}) = - \left[\text{[scribble]} \int_{-\infty}^{+\infty} x^2 e^{-x} dx + \text{[scribble]} \int_{-\infty}^{+\infty} e^{-x} d(x^2) \right] =$$

$$\text{[scribble]} + \int_0^{+\infty} x^2 e^{-x} dx = - \int_0^{+\infty} x^2 d(e^{-x}) =$$

$$= - \left[x^2 e^{-x} \Big|_0^{+\infty} - \int_0^{+\infty} e^{-x} d(x^2) \right] = - \left[0 - 2 \int_0^{+\infty} e^{-x} \cdot x dx \right] =$$

$$= \text{[scribble]} - 2 \int_0^{+\infty} x \cdot d(e^{-x}) = 2 \cdot 1 = 2$$

byla už počítána M_{ξ}^1

$$1) \text{ [scribble]} = M_{\xi}^2 - (M_{\xi}^1)^2 = 2 - (1)^2 = 1 < \infty$$

- 2) ξ_k - независимы
 3) ξ_k одинаково распределены
 (плотность распредел. $f(\xi)$ у всех ξ)

по простейшей
 ц.пл.

$$\frac{\frac{1}{n} \sum_{k=1}^n \xi_k - M\xi}{\sqrt{D\xi}} \cdot \sqrt{n} \rightarrow N(0, 1)$$

(X)

$$\underbrace{\sqrt{n}(\bar{\xi}_k - 1)}_{\eta} \sim N(0, 1)$$

$$\eta = \sqrt{n} \bar{\xi}_k - \sqrt{n}$$

$$\eta + \sqrt{n} = \sqrt{n} \bar{\xi}_k$$

$$\bar{\xi}_k = \frac{1}{\sqrt{n}} \eta + 1$$

~~$$\bar{\xi}_k \sim N(1, \frac{1}{n})$$~~

$$M_{\bar{\xi}_k} = M\left[\frac{1}{\sqrt{n}} \eta + 1\right] = M\left[\frac{1}{\sqrt{n}} \eta\right] +$$

$$+ M[1] = \frac{1}{\sqrt{n}} \cdot \underbrace{M_{\eta}}_{=0} + 1 = 1$$

$$\mathcal{D}_{\bar{\xi}_k} = \mathcal{D}\left[\frac{1}{\sqrt{n}} \eta + 1\right] = \left(\frac{1}{\sqrt{n}}\right)^2 \mathcal{D}_{\eta} = \frac{1}{n} \underbrace{\mathcal{D}_{\eta}}_{=1} = \frac{1}{n}$$

$$\bar{\xi}_k \sim N\left(1, \frac{1}{n}\right)$$

$$p(x) = \frac{1}{\sigma \sqrt{2\pi}} \cdot e^{-\frac{(x-a)^2}{2\sigma^2}} =$$

$$= \frac{1}{\sqrt{\frac{1}{n} \cdot 2\pi}} \cdot e^{-\frac{(x-1)^2}{2 \cdot \frac{1}{n}}}$$