Расчетное задание

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Выборка: 25

1. $\overrightarrow{X} \sim N(a, \sigma^2)$

а)

$$\text{I}.\ G(\overrightarrow{X}, a) = \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} \sim N(0, 1)$$

$$\text{II}.\ t : P\left(-t < \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} < t\right) = 1 - \varepsilon \Rightarrow t = \tau_{1-\varepsilon/2}$$

$$\text{III}.\ P\left(\overline{X} - \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}} < a < \overline{X} + \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}}\right) = 1 - \varepsilon$$

Ответ: $\overline{X} =$; $\tau_{1-\varepsilon/2} =$; $P\left(< a < \right) = 0.95$

б)

$$\text{I}.\ G(\overrightarrow{X}, a) = \sqrt{n} \cdot \frac{\overline{X} - a}{S_0^2} \sim N(0, 1)$$

$$\text{II}.\ t : P\left(-t < \sqrt{n} \cdot \frac{\overline{X} - a}{S_0^2} < t\right) = 1 - \varepsilon \Rightarrow t = \tau_{1-\varepsilon/2}$$

$$\text{III}.\ P\left(\overline{X} - \tau_{1-\varepsilon/2} \cdot \frac{S_0^2}{\sqrt{n}} < a < \overline{X} + \tau_{1-\varepsilon/2} \cdot \frac{S_0^2}{\sqrt{n}}\right) = 1 - \varepsilon$$

Ответ: $S_0^2 =$; $P\left(< a < \right) = 0.95$

в)

$$\text{I}.\ G(\overrightarrow{X}, a) = \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} \sim N(0, 1)$$

$$\text{II}.\ t : P\left(-t < \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} < t\right) = 1 - \varepsilon \Rightarrow t = \tau_{1-\varepsilon/2}$$

$$\text{III}.\ P\left(\overline{X} - \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}} < a < \overline{X} + \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}}\right) = 1 - \varepsilon$$

Ответ: $\overline{X} =$; $\tau_{1-\varepsilon/2} =$; $P\left(< a < \right) = 0.95$

г)

$$\text{I}.\ G(\overrightarrow{X}, a) = \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} \sim N(0, 1)$$

$$\text{II}.\ t : P\left(-t < \sqrt{n} \cdot \frac{\overline{X} - a}{\sigma} < t\right) = 1 - \varepsilon \Rightarrow t = \tau_{1-\varepsilon/2}$$

$$\text{III}.\ P\left(\overline{X} - \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}} < a < \overline{X} + \tau_{1-\varepsilon/2} \cdot \frac{\sigma}{\sqrt{n}}\right) = 1 - \varepsilon$$

Ответ: $\overline{X} =;\ \tau_{1-\varepsilon/2} =;\ P\left(< a < \right) = 0.95$
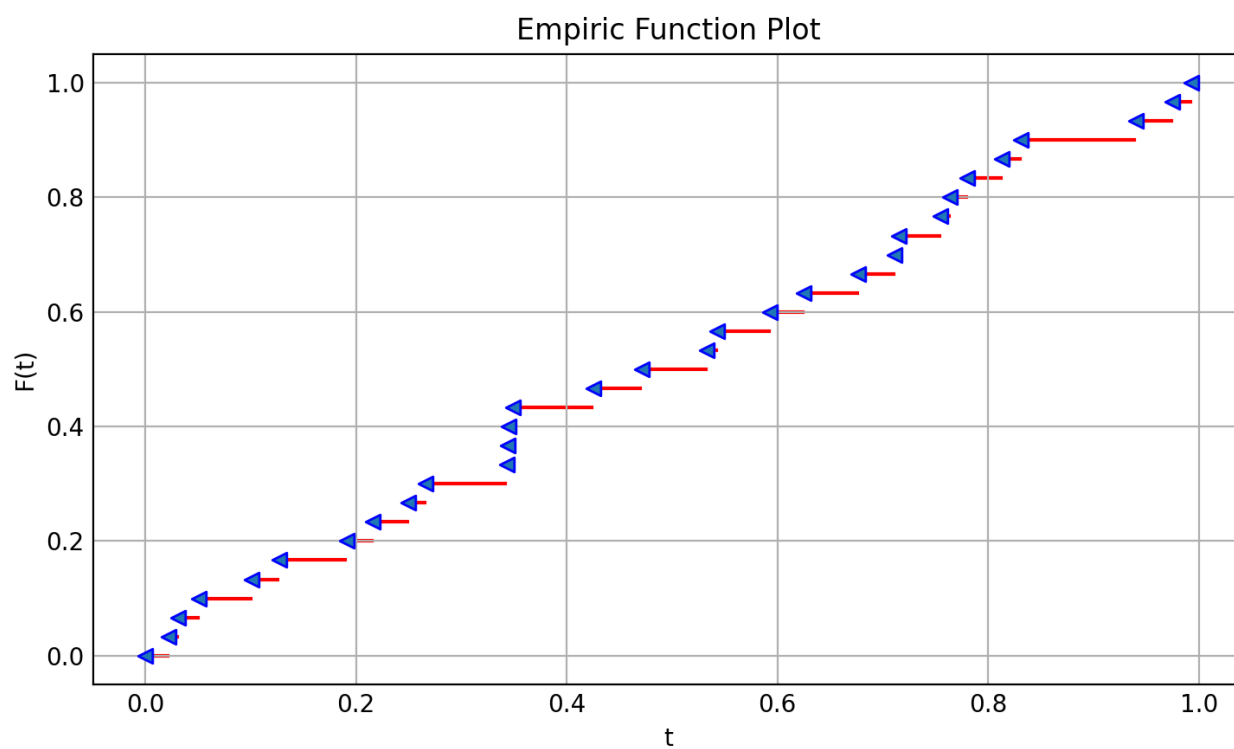
2.

3.

Empiric Function Plot

Figure 1: График эмпирической функции распределения