Свойства:

$N(\mu_1, \sigma_1^2) + N(\mu_2, \sigma_2^2) = N(\mu_1 + \mu_2, \sigma_1^2 + \sigma_2^2)$

независими

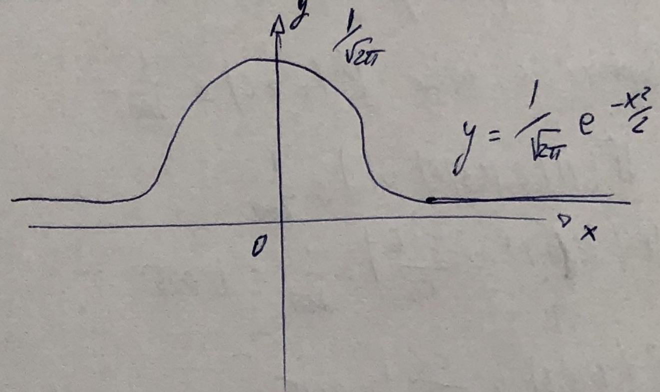
$N(\mu_1, \sigma_1^2) + c = N(\mu_1 + c, \sigma_1^2)$

$cN(\mu_1, \sigma_1^2) = N(c\mu_1, c^2\sigma_1^2)$

Стандартно нормално — $N(0,1)$

$f_{N(0,1)}(t) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$

$F_{N(0,1)}(t) = \int_{-\infty}^{t} \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} dx =: \Phi(t)$



Зад $A \sim N(100, 49)$

$B \sim N(90, 25)$

Диодите от A и B са равен брой. Избираме случаен. Каква е вероятността характеристиката му да е ≥ 85.

Решение

$X =$ „избраният диод"

$\mathbb{P}(X \geq 85) = \frac{1}{2}\mathbb{P}(A \geq 85) + \frac{1}{2}\mathbb{P}(B \geq 85)$

$\mathbb{P}(A \geq 85) = \mathbb{P}(N(100,49) \geq 85) = \int_{85}^{\infty} \frac{1}{\sqrt{2\pi \cdot 49}} e^{-\frac{(t-100)^2}{2 \cdot 49}} dt =$

$= \mathbb{P}(N(100,49) - 100 \geq 85 - 100) = \mathbb{P}(N(0,49) \geq -15) = \mathbb{P}\left(\frac{N(0,49)}{7} \geq -\frac{15}{7}\right) =$

$= \mathbb{P}(N(0,1) \geq -\frac{15}{7}) \approx \underbrace{\mathbb{P}(N(0,1) \geq -2{,}14)}_{= 1 - \mathbb{P}(N(0,1) \leq -2{,}14)} \overset{\text{таблица}}{\approx} 1 - 0{,}0162 = 0{,}9838 \approx 98{,}3\%$

$\mathbb{P}(B \geq 85) = \mathbb{P}(N(90,25) \geq 85) = \mathbb{P}\left(\frac{N(90,25) - 90}{5} \geq \frac{85 - 90}{5}\right) = \mathbb{P}(N(0,1) \geq -1) =$

$= 1 - \underset{\mathbb{P}(N(0,1) \leq -1)}{\underset{\parallel}{\Phi(-1)}} = 1 - 0{,}1587 = 0{,}8413$

Отг. на зад $\frac{1}{2}(0{,}9838 + 0{,}8413)$