

Кемат Кордект $\lambda M - 25$

1. $p_{11} = 0,2$, $p_{21} = 0,1$ $p_{63} = 0,3$

вигмови 0:

$$0,8 \cdot 0,9 \cdot 0,7 = 0,504$$

вигмови 1:

$$0,8 \cdot 0,9 \cdot 0,3 + 0,8 \cdot 0,1 \cdot 0,7 + 0,2 \cdot 0,9 \cdot 0,7 = \\ = 0,216 + 0,056 + 0,126 = 0,398$$

вигмови 2:

$$0,8 \cdot 0,1 \cdot 0,3 + 0,2 \cdot 0,9 \cdot 0,3 + 0,2 \cdot 0,1 \cdot 0,7 = \\ = 0,024 + 0,054 + 0,014 = 0,092$$

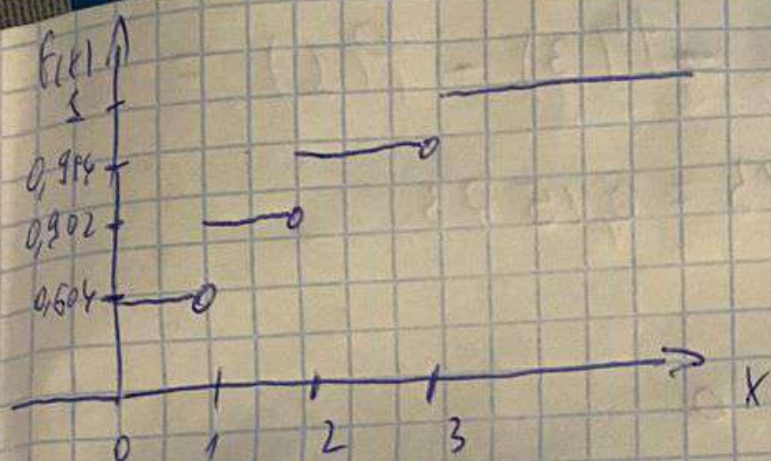
вигмови 3:

$$0,2 \cdot 0,1 \cdot 0,3 = 0,006$$

Перевірка: $0,504 + 0,398 + 0,092 + 0,006 = 1$

$y = x_i$	0	1	2	3
$p = p_i$	0,504	0,398	0,092	0,006

$$F(x) = \begin{cases} 0, & x < 0 \\ 0,504, & 0 \leq x < 1 \\ 0,902, & 1 \leq x < 2 \\ 0,994, & 2 \leq x < 3 \\ 1, & x \geq 3 \end{cases}$$



$$E(\xi) = 0 \cdot 0,504 + 1 \cdot 0,398 + 2 \cdot 0,092 + 3 \cdot 0,006 = 0,398 + 0,184 + 0,018 = 0,6$$

$$D(\xi) = 0,398 + 4 \cdot 0,092 + 9 \cdot 0,006 - 0,36 = 0,398 + 0,368 + 0,054 - 0,36 = 0,46$$

$$\sigma(\xi) = \sqrt{D(\xi)} \approx 0,678$$

$$2. \quad \sigma = 50, \quad a = E(\xi) = 800$$

$$f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{(x-a)^2}{2\sigma^2}} = \frac{1}{50 \sqrt{2\pi}} e^{-\frac{(x-800)^2}{5000}}$$

$$F(x) = \frac{1}{\sigma \sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{(z-800)^2}{5000}} dz$$

$$P(650 \leq \xi \leq 750) = \Phi\left(\frac{750-800}{50}\right) - \Phi\left(\frac{650-800}{50}\right)$$

$$P(-1) - P(-3) = P(3) - P(1) =$$

$$= 0,4986 - 0,3413 = 0,1573$$

3.

$$F(x) = \begin{cases} 0, & x \leq 0 \\ C(x^2 + 2x), & 0 < x \leq 1 \\ 1, & x > 1 \end{cases}$$

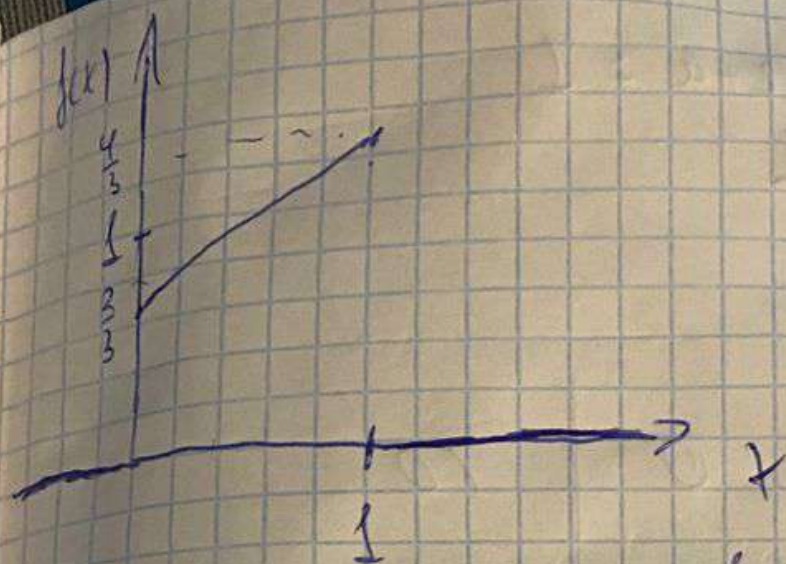
$$C \cdot (1 + 2) = 1$$

$$C = \frac{1}{3}$$

$$F(x) = \begin{cases} 0, & x \leq 0 \\ \frac{1}{3}(x^2 + 2x), & 0 < x \leq 1 \\ 1, & x > 1 \end{cases}$$

$$f(x) = \begin{cases} 0, & x \leq 0 \\ \frac{2}{3}(x+1), & 0 < x \leq 1 \\ 0, & x > 1 \end{cases}$$





$$E(\xi) = \int_0^1 x f(x) dx = \frac{2}{3} \int_0^1 (x^2 + x) dx =$$

$$= \frac{2}{3} \left(\frac{x^3}{3} + \frac{x^2}{2} \right) \Big|_0^1 = \frac{2}{3} \left(\frac{1}{3} + \frac{1}{2} \right) - 0 = \frac{2}{3} \cdot \frac{5}{6} = \frac{10}{18} = \frac{5}{9}$$

$$D(\xi) = \frac{2}{3} \int_0^1 x^2 (x+1) dx - \left(\frac{5}{9} \right)^2 = \frac{2}{3} \left(\frac{x^4}{4} + \frac{x^3}{3} \right) \Big|_0^1 - \left(\frac{5}{9} \right)^2 =$$

$$= \frac{2}{3} \left(\frac{1}{4} + \frac{1}{3} \right) - \left(\frac{5}{9} \right)^2 = \frac{2}{3} \cdot \frac{7}{12} - \left(\frac{5}{9} \right)^2 \approx 0,388 - 0,309 =$$

$$= 0,08$$

$$G(\xi) = \sqrt{D(\xi)} \approx 0,282$$

$$P(0,8 < \xi < 1,2) = F(1,2) - F(0,8) = \frac{1}{3} (1,44 + 2,4) =$$

$$- \frac{1}{3} (0,64 + 1,6) = \frac{1}{3} (1,6) \approx 0,533$$

$$4. \quad 0,25 + 0,35 + 0,2 + a = 1$$

$$0,8 + a = 1$$

$$a = 0,2$$

$\xi = x_i$ $\eta = y_j$	-10	0	10
0	0,1	0,05	0,1
2	0,2	0,15	0
4	0,2	0,1	0,1

$\xi = x_i$	-10	0	10
$p = p(x_i)$	0,5	0,3	0,2

$\eta = y_j$	0	2	4
$p = p(y_j)$	0,25	0,35	0,4

$$E(\eta) = -5 + 2 = -3$$

$$D(\eta) = 50 + 20 - 9 = 61$$

$$E(y) \approx 7,81$$

$$E(y) = 0,7 + 1,6 = 2,3$$

$$D(y) = 4 \cdot 0,35 + 16 \cdot 0,42 + 6,4 - 2,3^2 = 7,8 - 5,29 = 2,51$$

$$E(h) \approx 1,584$$

$$K_{xy} = -20 \cdot 0,2 - 40 \cdot 0,2 + 40 \cdot 0,1 = -4 - 8 + 4 = -4$$

$$(-3) \cdot 2,36 = -4 - 8 + 4 + 2,58 \cdot 6,9 = 6,9 \neq 0$$

$$r_{14} = \frac{-1,1}{\sqrt{1,584 \cdot 7,81}} \approx -0,089$$

\Rightarrow некоррелированные

$$5. A = \frac{\binom{3}{12} \cdot \binom{1}{8}}{\binom{4}{20}} = \frac{\frac{12 \cdot 11 \cdot 10}{3!}}{\frac{20 \cdot 19 \cdot 18 \cdot 17}{4!}} = \frac{253440}{697180} \approx 0,363$$

$$\approx 0,363$$

$$E = \text{up} = 20 \cdot 0,363 = 7,26; \quad \eta = \text{up} = 4,62$$