# Метод Квадратного Корня

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ИВТ-1.1

| A | | | | | B |
|---|---|---|---|---|---|
| 16 | 4 | 8 | 12 | 4 | 44 |
| 4 | 5 | 6 | 7 | 9 | 25 |
| 8 | 6 | 9 | 11 | 5 | 39 |
| 12 | 7 | 11 | 23 | 12 | 65 |
| 4 | 3 | 5 | 12 | 23 | 47 |

$$r_{ij} = \frac{a_{ij}}{r_{ii}}$$

$$r_{ii} = \sqrt{a_{ii} - \sum_{k=1}^{i-1} r_{ki}^2}$$

$$r_{ij} = \left(a_{ij} - \sum_{k=1}^{i-1} r_{ki} r_{kj}\right) / r_{ii}$$

$r_{11} = \sqrt{a_{11}} = \sqrt{16} = 4$

$r_{12} = \frac{4}{4} = 1$

$r_{13} = \frac{8}{4} = 2$

$r_{14} = \frac{12}{4} = 3$

$r_{15} = \frac{16}{4} = 4$

$r_{22} = \sqrt{5 - 1^2} = 2$

$r_{23} = (6 - 2)/2 = 2$

$r_{33} = \sqrt{9 - (2^2 + 2^2)} = 1$

$r_{34} = \frac{11 - 2 \cdot 3 - 2 \cdot 2}{1} = 1$

$r_{35} = \frac{5 - 2 \cdot 1 - 2 \cdot 1}{1} = 1$

$r_{44} = \sqrt{23 - (3^2 + 2^2 + 1^2)} = 3$

$r_{45} = \frac{12 - 3 - 2 - 1}{3} = 2$

$r_{55} = \sqrt{23 - (1 + 1 + 1 + 2^2)} = 4$

$$R = \begin{pmatrix} 4 & 1 & 2 & 3 & 1 \\ & 2 & 2 & 2 & 1 \\ & & 1 & 1 & 1 \\ & & & 3 & 2 \\ & & & & 4 \end{pmatrix}$$

$$R^T = \begin{pmatrix} 4 & & & & \\ 1 & 2 & & & \\ 2 & 2 & 1 & & \\ 3 & 2 & 1 & 3 & \\ 1 & 1 & 1 & 2 & 4 \end{pmatrix}$$

$R^T Z = B$

$$\begin{aligned}
4Z_1 &= 44 \\
Z_1 + 2Z_2 &= 25 \\
2Z_1 + 2Z_2 + Z_3 &= 39 \\
3Z_1 + 2Z_2 + Z_3 + 3Z_4 &= 65 \\
Z_1 + Z_2 + Z_3 + 2Z_4 + 4Z_5 &= 47
\end{aligned}$$

$$Z_1 = \frac{44}{4} = 11$$

$$Z_2 = \frac{25 - 11}{2} = 7$$

$$Z_3 = \frac{39 - 2\cdot 11 - 2\cdot 7}{1} = 3$$

$$Z_4 = \frac{65 - 3\cdot 11 - 2\cdot 7 - 3}{3} = 5$$

$$Z_5 = \frac{47 - 11 - 7\cdot 3 - 2\cdot 5}{4} = 4$$

$R_X = Z$

$$4X_1 + X_2 + 2X_3 + 3X_4 + X_5 = 11 \Rightarrow X_1 = \frac{11 - 1\cdot 2\cdot 1 - 3\cdot 1 - 1}{4} = 1$$

$$X_2 + 2X_3 + 2X_4 + X_5 = 7 \Rightarrow X_2 = \frac{7 - 1 - 2\cdot 1 - 2}{2} = 1$$

$$X_3 + X_4 + X_5 = 3 \Rightarrow X_3 = \frac{3 - 1 - 1}{1} = 1$$

$$3X_4 + 2X_5 = 5 \Rightarrow X_4 = \frac{5 - 2\cdot 1}{3} = 1$$

$$4X_5 = 4 \Rightarrow X_5 = 1$$

Ответ: $X_1 = 1,\ X_2 = 1,\ X_3 = 1,\ X_4 = 1,\ X_5 = 1$