

**Theme 8 (part 1). The elements of correlation theory**

**Елементи теорії кореляції**

**CORRELATION TABLE AND CORRELATION FIELD**

**TASKS.** Results of values of two dimensional random variable are given as the correlation table.

- 1) calculate numerical characteristics;
- 2) construct the theoretical regression line for this dependence;
- 3) calculate the correlation coefficient;
- 4) make an analysis the obtained values.

**Task 1**

| $Y \backslash X$ | 1 | 2 | 3  | 4 | 5 |
|------------------|---|---|----|---|---|
| 4                | 2 | 3 |    |   |   |
| 6                |   | 4 | 10 | 1 |   |
| 8                |   | 3 | 12 | 4 |   |
| 10               |   |   | 3  | 6 | 2 |

**Task 2**

| $Y \backslash X$ | 15 | 20 | 25 | 30 | 35 | 40 |
|------------------|----|----|----|----|----|----|
| 100              | 2  | 1  |    | 7  |    |    |
| 120              | 4  |    | 2  |    |    | 3  |
| 140              |    | 5  |    | 10 | 5  | 2  |
| 160              |    |    | 3  | 1  | 2  | 3  |

**Task 3**

| $Y \backslash X$ | 4 | 9 | 14 | 19 | 24 | 29 |
|------------------|---|---|----|----|----|----|
| 10               |   |   |    |    |    |    |
| 20               |   |   |    |    |    |    |
| 30               | 2 | 3 | 3  | 50 | 2  |    |
| 40               |   | 7 | 2  | 10 | 6  |    |
| 50               |   |   | 1  | 4  | 7  | 3  |

**Task 4**

| $Y \backslash X$ | 10 | 15 | 20 | 25 | 30 | 35 |
|------------------|----|----|----|----|----|----|
| 30               | 2  | 6  |    |    |    |    |
| 40               |    | 4  | 4  |    |    |    |
| 50               |    |    | 7  | 35 | 8  |    |
| 60               |    |    | 2  | 10 | 8  |    |
| 70               |    |    |    | 5  | 6  | 3  |

**Task 5**

| $Y \backslash X$ | 15 | 20 | 25 | 30 | 35 | 40 | $l_k$ |
|------------------|----|----|----|----|----|----|-------|
| 5                |    |    |    |    |    |    | 6     |
| 10               |    | 2  |    |    |    |    | 10    |
| 15               | 4  | 6  | 4  | 45 | 2  |    | 53    |
| 20               |    |    | 6  | 8  | 6  |    | 16    |
| 25               |    |    | 2  | 4  | 7  | 4  | 15    |
| $h_i$            | 4  | 8  | 12 | 57 | 15 | 4  | 100   |

**Task 6**

| $Y \backslash X$ | 5 | 10 | 15 | 20 | 25 | 30 | $l_k$ |
|------------------|---|----|----|----|----|----|-------|
| 20               |   |    |    |    |    |    | 6     |
| 30               |   | 5  |    |    |    |    | 8     |
| 40               | 1 | 5  | 3  | 40 | 2  |    | 51    |
| 50               |   |    | 9  | 11 | 6  |    | 21    |
| 60               |   |    | 4  | 4  | 7  | 3  | 14    |
| $h_i$            | 1 | 10 | 16 | 55 | 15 | 3  | 100   |

**Task 7**

| $Y \backslash X$ | 10 | 15 | 20 | 25 | 30 | 35 | $l_k$ |
|------------------|----|----|----|----|----|----|-------|
| 6                |    |    |    |    |    |    | 6     |
| 12               |    |    |    |    |    |    | 8     |
| 18               | 4  | 2  | 2  | 40 | 5  |    | 50    |
| 24               |    | 6  | 5  | 8  | 7  |    | 17    |
| 30               |    |    | 2  | 4  | 7  | 8  | 19    |
| $h_i$            | 4  | 8  | 9  | 58 | 19 | 8  | 100   |

**Task 8**

| $Y \quad X$ | 5 | 10 | 15 | 20 | 25 | 30 | $l_k$ |
|-------------|---|----|----|----|----|----|-------|
| 8           |   |    |    |    |    |    | 6     |
| 12          |   |    |    |    |    |    | 10    |
| 16          | 2 | 4  | 7  | 30 | 10 |    | 45    |
| 20          |   | 3  | 5  | 10 | 8  |    | 25    |
| 24          |   |    | 7  | 5  | 6  | 3  | 14    |
| $h_i$       | 2 | 7  | 19 | 45 | 24 | 3  | 100   |

**Task 9**

| $Y \quad X$ | 2 | 7  | 12 | 17 | 22 | 27 | $l_k$ |
|-------------|---|----|----|----|----|----|-------|
| 10          |   |    |    |    |    |    | 6     |
| 20          |   |    |    |    |    |    | 8     |
| 30          | 2 | 4  | 2  | 50 | 2  |    | 55    |
| 40          |   | 6  | 3  | 10 | 6  |    | 17    |
| 50          |   |    | 1  | 4  | 7  | 3  | 14    |
| $h_i$       | 2 | 10 | 6  | 64 | 15 | 3  | 100   |

**Task 10**

| $Y \quad X$ | 11 | 16 | 21 | 26 | 31 | 36 | $l_k$ |
|-------------|----|----|----|----|----|----|-------|
| 25          |    |    |    |    |    |    | 6     |
| 35          |    |    |    |    |    |    | 9     |
| 45          | 2  | 4  | 3  | 45 | 4  |    | 55    |
| 55          |    | 6  | 6  | 8  | 6  |    | 16    |
| 65          |    |    | 2  | 4  | 7  | 3  | 14    |
| $h_i$       | 2  | 10 | 11 | 57 | 17 | 3  | 100   |

**Task 11**

| $Y \quad X$ | 4 | 9 | 14 | 19 | 24 | 29 | $l_k$ |
|-------------|---|---|----|----|----|----|-------|
| 8           |   |   |    |    |    |    | 6     |
| 18          |   |   |    |    |    |    | 9     |
| 28          | 3 | 3 | 4  | 2  | 8  |    | 50    |
| 38          |   | 5 | 40 | 10 | 6  |    | 21    |
| 48          |   |   | 5  | 4  | 7  | 3  | 14    |
| $h_i$       | 3 | 8 | 49 | 16 | 21 | 3  | 100   |

**Task 12**

| $Y \quad X$ | 5 | 10 | 15 | 20 | 25 | 30 | $l_k$ |
|-------------|---|----|----|----|----|----|-------|
| 11          |   |    |    |    |    |    | 6     |
| 21          |   |    |    |    |    |    | 8     |
| 31          | 4 | 2  | 3  | 45 | 5  |    | 55    |
| 41          |   | 5  | 5  | 8  | 7  |    | 17    |
| 51          |   |    | 2  | 4  | 7  | 3  | 14    |
| $h_i$       | 4 | 7  | 10 | 57 | 19 | 3  | 100   |

**Task 13**

| $Y \quad X$ | 8 | 10 | 12 | 14 | 16 |
|-------------|---|----|----|----|----|
| 9           | 3 |    |    |    |    |
| 13          | 8 | 7  | 1  |    |    |
| 17          |   | 5  | 29 | 5  |    |
| 21          |   | 4  | 12 | 4  | 8  |
| 25          |   |    |    | 8  | 6  |