

# Логіка. Програмна інженерія

1. Знайти ДНФ функції, що задана формулою  $(p \wedge (\bar{p} \rightarrow q)) \rightarrow q$

$$(p \wedge (\bar{p} \rightarrow q)) \rightarrow q \equiv (\bar{p} \vee \overline{(\bar{p} \rightarrow q)}) \vee q \equiv (\bar{p} \vee (\bar{p} \wedge \bar{q})) \vee q \equiv \bar{p} \vee q. \quad (1)$$

2. Одержані КНФ формули  $\overline{(p \vee q)} \wedge (p \rightarrow q)$

$$\overline{(p \vee q)} \wedge (p \rightarrow q) \equiv (\bar{p} \wedge \bar{q}) \wedge (\bar{p} \vee q) \equiv \bar{q} \wedge \bar{p} \wedge (\bar{p} \vee q) \equiv \bar{q} \wedge \bar{p}. \quad (2)$$

5. Побудувати таблиці істинності для функцій, що задані ДДНФ

Табл. 1: а)  $f(p, q, r) = p\bar{q}\bar{r} \vee \bar{p}q\bar{r} \vee p\bar{q}r$

| p | q | r | $p\bar{q}\bar{r}$ | $\bar{p}q\bar{r}$ | $p\bar{q}r$ | $f(p, q, r) = p\bar{q}\bar{r} \vee \bar{p}q\bar{r} \vee p\bar{q}r$ |
|---|---|---|-------------------|-------------------|-------------|--|
| T | T | T | F                 | F                 | F           | F  |
| T | T | F | F                 | F                 | F           | F  |
| T | F | T | F                 | F                 | T           | T  |
| T | F | F | T                 | F                 | F           | T  |
| F | T | T | F                 | F                 | F           | F  |
| F | T | F | F                 | T                 | F           | T  |
| F | F | T | F                 | F                 | F           | F  |
| F | F | F | F                 | F                 | F           | F  |

Табл. 2: б)  $f(p, q, r) = pqr \vee p\bar{q}\bar{r} \vee \bar{p}\bar{q}r$

| p | q | r | $pqr$ | $p\bar{q}\bar{r}$ | $\bar{p}\bar{q}r$ | $f(p, q, r) = pqr \vee p\bar{q}\bar{r} \vee \bar{p}\bar{q}r$ |
|---|---|---|-------|-------------------|-------------------|--|
| T | T | T | T     | F                 | F                 | T  |
| T | T | F | F     | F                 | F                 | F  |
| T | F | T | F     | F                 | F                 | F  |
| T | F | F | F     | T                 | F                 | T  |
| F | T | T | F     | F                 | F                 | F  |
| F | T | F | F     | F                 | F                 | F  |
| F | F | T | F     | F                 | T                 | T  |
| F | F | F | F     | F                 | F                 | F  |

Табл. 3: с)  $f(p, q, r) = pq\bar{r} \vee \bar{p}qr \vee p\bar{q}r$ 

| p | q | r | $pqr$ | $\bar{p}qr$ | $p\bar{q}r$ | $f(p, q, r) = pq\bar{r} \vee \bar{p}qr \vee p\bar{q}r$ |
|---|---|---|-------|-------------|-------------|--|
| T | T | T | F     | F           | F           | F  |
| T | T | F | T     | F           | F           | T  |
| T | F | T | F     | F           | T           | T  |
| T | F | F | F     | F           | F           | F  |
| F | T | T | F     | T           | F           | T  |
| F | T | F | F     | F           | F           | F  |
| F | F | T | F     | F           | F           | F  |
| F | F | F | F     | F           | F           | F  |

Табл. 4: д)  $f(p, q, r) = \bar{p}qr \vee p\bar{q}r \vee p\bar{q}r$ 

| p | q | r | $\bar{p}qr$ | $p\bar{q}r$ | $p\bar{q}r$ | $f(p, q, r) = \bar{p}qr \vee p\bar{q}r \vee p\bar{q}r$ |
|---|---|---|-------------|-------------|-------------|--|
| T | T | T | F           | F           | F           | F  |
| T | T | F | F           | F           | F           | F  |
| T | F | T | F           | F           | F           | F  |
| T | F | F | F           | T           | F           | T  |
| F | T | T | T           | F           | F           | T  |
| F | T | F | F           | F           | F           | F  |
| F | F | T | F           | F           | T           | T  |
| F | F | F | F           | F           | F           | F  |