

## Домашняя работа № 6

### 1. Формат Ф1

$$A = 29,52 = 1D,(851EB)_{16} = 0,1D851EB_{16} \cdot 16^2$$

0	1	0	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$B = 53,04 = 35,0A3D_{16} = 0,350A3D_{16} \cdot 16^2$$

0	1	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$P_a = P_b$$

а) Оба операнда положительные ( $A > 0$ ;  $B > 0$ )

$$M_A = 0001\ 1101\ 1001$$

$$M_B = 0011\ 0101\ 0001$$

$$M_C = 0101\ 0010\ 1010$$

Результат сложения нормализован

0	1	0	0	0	0	1	0	0	1	0	1	0	0	1	0	1	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C = M_C \cdot 16^{P_c} = (0,52A)_{16} \cdot 16^2 = 52, A_{16} = 82,625_{10}$$

$$C_T = 82,56$$

$$\Delta C = 82,56 - 82,625 = -0,065$$

$$\delta C = \left| \frac{-0,065}{82,56} \right| \cdot 100\% = 0,08\%$$

б)  $A < 0$ ;  $B > 0$ ;

$$M_B = 0011\ 0101\ 0001$$

$$M_A = 0001\ 1101\ 1001$$

$$M_C = 0001\ 0111\ 1000$$

Результат сложения нормализован

0	1	0	0	0	0	1	0	0	0	0	1	0	1	1	1	1	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C^* = M_C \cdot 16^{P_c} = (0,178)_{16} \cdot 16^2 = 17,8_{16} = 23,5$$

$$C_T = 23,52$$

$$\Delta C = 23,52 - 23,5 = 0,02$$

$$\delta C = \left| \frac{0,02}{23,52} \right| \cdot 100\% = 0,085\%$$

в)  $A > 0$ ;  $B < 0$ ;

$$M_A = 0001\ 1101\ 1001$$

$$M_B = 0011\ 0101\ 0001$$

$$M_C = 1110\ 1000\ 1000$$

Результат представлен в дополнительном коде

0	1	0	0	0	0	1	0	0	0	0	1	0	1	1	1	1	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C^* = M_C \cdot 16^{P_C} = -(0,178)_{16} \cdot 16^2 = -17,8_{16} = -23,5$$

$$C_T = -23,52$$

$$\Delta C = -23,52 + 23,5 = -0,02$$

$$\delta C = \left| \frac{-0,02}{-23,52} \right| \cdot 100\% = 0,085\%$$

## 2. Формат Ф2

$$A = 29,52 = 1D,851_{16} = (0,1\ 1101\ 1000\ 0101\ 000)_2 \cdot 2^5$$

0	1	0	0	0	0	1	0	1	1	1	0	1	1	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$B = 53,04 = 35,0A3D_{16} = (0,1\ 1010\ 1000\ 0101\ 0001)_2 \cdot 2^6$$

0	1	0	0	0	0	1	1	0	1	0	1	0	1	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$X_C = 1\ 0\ 0\ 0\ 0\ 1\ 0\ 1$$

$$X_B = 1\ 0\ 0\ 0\ 0\ 1\ 1\ 0$$

$$(X_A - X_B)_{\text{доп}} = 1\ 1\ 1\ 1\ 1\ 1\ 1\ 1$$

$$(X_A - X_B) = 1, X_C = X_B = 6$$

а) Оба операнда положительные ( $A > 0$ ;  $B > 0$ )

$$M_A = 0111\ 0110\ 0001$$

$$M_B = 1101\ 0100\ 0010$$

$$M_C = 1.0100\ 1010\ 0011$$

Результат сложения денормализован влево

$$M_C = 0.1\ 0100\ 1010\ 001$$

$$X_C = X_C + 1 = 7$$

0	1	0	0	0	0	1	1	1	0	1	0	0	1	0	1	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C^* = M_C \cdot 2^{P_C} = (1010010,10001)_2 = 82,53125$$

$$C_T = 82,56$$

$$\Delta C = 82,56 - 82,53125 = 0,02875$$

$$\delta C = \left| \frac{0,02875}{82,56} \right| \cdot 100\% = 0,035\%$$

б)  $A < 0; B > 0;$

$$M_B = 1101\ 0100\ 0010$$

$$M_A = 0111\ 0110\ 0001$$

$$M_C = 0101\ 1110\ 0001$$

Результат нормализован

0	1	0	0	0	0	1	1	1	1	0	1	1	1	1	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C^* = M_C \cdot 2^{P_c} = (0,010111100001)_2 \cdot 2^6 = (10111,100001)_2 = 23,515625$$

$$C_T = 23,52$$

$$\Delta C = 23,52 - 23,515625 = 0,004375$$

$$\delta C = \left| \frac{0,004375}{23,52} \right| \cdot 100\% = 0,019\%$$

в)  $A > 0; B < 0;$

$$M_A = 0111\ 0110\ 0001$$

$$M_B = 1101\ 0100\ 0010$$

$$M_C = 1010\ 0001\ 1111$$

Результат представлен в дополнительном коде

0	1	0	0	0	0	1	1	1	1	0	1	1	1	1	0	0	0	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

$$C^* = M_C \cdot 2^{P_c} = (0,010111,100001)_2 \cdot 2^6 = (10111,100001)_2 = 23,515625$$

$$C_T = 23,52$$

$$\Delta C = 23,52 - 23,515625 = 0,004375$$

$$\delta C = \left| \frac{0,004375}{23,52} \right| \cdot 100\% = 0,019\%$$

В формате Ф2 результаты получились более точные из-за того, что операнды представлены точнее.