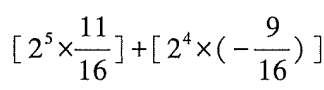
**6.27**

(1)

[25×11/16]阶补尾补 = 00,101; 00.101100 [24×(-9/16)]阶补尾补= 00,100; 11. 011100

①对阶：[24×(-9/16)]阶补尾补= 00,100; 11. 011100= 00,101; 11.001110

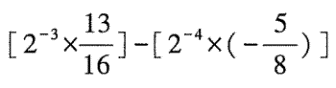
②尾数求和：00.101100 + 11.001110 = 00.011010

③规格化：00,101; 00.011010 = 00,100; 00.110100

④舍入：无需

⑤溢出：无

**最终结果为x+y=00,100; 00.110100=24×13/16=13**

(2)

[x] 阶补尾补=11,101; 00.110100 [-y] 阶补尾补=11,100; 00.101000

①对阶：[-y] 阶补尾补=11,101; 00.010100

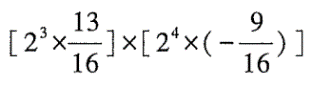
②尾数相减：00.110100+00.010100 = 01.001000

③规格化11,101; 01.001000 = 11,110; 00.100100

④舍入：无需

⑤溢出：无

**最终结果为x-y=11,010; 00.100100=2-2×9/16=9/64**

(3)

[x]阶补尾补=00,011; 00.110100 [y]阶补尾补=00,100; 11.011100

①阶码相加：00,011+00,100=00,111

②尾数相乘：[Sx]补=00.110100 [-Sx]补=11.001100 [Sy]补=1.011100

补码一位乘

|  |  |  |  |
| --- | --- | --- | --- |
| 部分积 | 乘数 | yi+1 | 操作 |
| 00.000000  00.000000  00.000000  +11.001100 | 1.011100  01.01110  001.0111 | 0  0  0 | ->1  ->1  +[-Sx]补 |
| 11.001100  11.100110  11.110011  11.111001  +00.110100 | 0001.011  00001.01  100001.0 | 1  1  1 | ->1  ->1  ->1  +[Sx]补 |
| 00.101101  00.010110  +11.001100 | 1100001. | 0 | ->1  +[-Sx]补 |
| 11.100010 | 110000 |  | 最后一步不移位 |

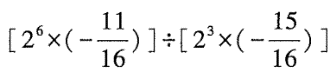
[Sx×Sy]补=11.100010 110000

③规格化：00,111; 11.100010 110000 = 00,110; 11.000101 100000

④舍入：采取0舍1入法得[x×y]阶补尾补=00,110; 11.000110

⑤溢出：无

**最终结果为x×y=00,110; 11.111010=26×(-3/32)**

(4)

[x]阶补尾补=00,110; 11,101100 [y]阶补尾补=00,011; 11.111100

①阶码相减：00,110-00,011=00,110+11,101=00,011

②尾数相除：[Sx]补=11.101100 [Sy]补=11. 000100 [-Sy]补=00.111100

补码加减交替法

|  |  |  |
| --- | --- | --- |
| z被除数（余数） | 商 | 操作 |
| 11.101100  +00.111100 | 0.000000 | z、Sy同号  +[-Sy]补 |
| 00.010000  00.100000  +11.000100 | 0. | 异号，上商0  1<-  +[Sy]补 |
| 11.100100  11.001000  +00.111100 | 0.1 | 同号，上商1  1<-  +[-Sy]补 |
| 00.000100  00.001000  +11.000100 | 0.10 | 异号，上商0  1<-  +[Sy]补 |
| 11.001100  10.011000  +00.111100 | 0.101 | 同号，上商1  1<-  +[-Sy]补 |
| 11.010100  10.101000  +00.111100 | 0.1011 | 同号，上商1  1<-  +[-Sy]补 |
| 11.100100  11.001000  +00.111100 | 0.10111 | 同号，上商1  1<-  +[-Sy]补 |
| 00.000100 | 0.101111 | 末位恒置1 |

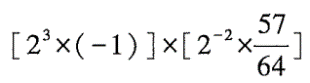
[Sx÷Sy]补=0.101111

③规格化00,011; 00.101111已经是规格化数

④舍入：无需

⑤溢出：无

**最终结果为x÷y=00,011; 00.101111=23×47/64**

(5)

[x]阶补尾补=00,011; 11.000000 [y]阶补尾补=11,110; 00.111001

①阶码相加：00,011+11,110=00,001

②尾数相乘：[Sx]补=11.000000 [-Sx]补=01.000000 [Sy]补=0.111001

补码一位乘

|  |  |  |  |
| --- | --- | --- | --- |
| 部分积 | 乘数 | yi+1 | 操作 |
| 00.000000  +01.000000 | 0.111001 | 0 | +[-Sx]补 |
| 01.000000  00.100000  +11.000000 | 00.11100 | 1 | ->1  +[Sx]补 |
| 11.100000  11.110000  11.111000  +01.000000 | 000.1110  0000.111 | 0  0 | ->1  ->1  +[-Sx]补 |
| 00.111000  00.011100  00.001110  00.000111  +11.000000 | 00000.11  000000.1  0000000. | 1  1  1 | ->1  ->1  ->1  +[Sx]补 |
| 11.000111 | 000000 |  | 最后一步不移位 |

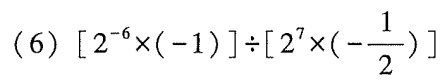
[Sx×Sy]补=11.000111 000000

③规格化：00,001; 11.100010 110000 = 00,110; 11.000101 100000

④舍入：采取0舍1入法得[x×y]阶补尾补=00,110; 11.000110

⑤溢出：无

**最终结果为x×y=00,110; 11.111010=26×(-3/32)**

(6)

[x]阶补尾补=11,010; 11,000000 [y]阶补尾补=00,111; 11.100000

①阶码相减：11,010-00,111=00,110+11,001=11,111

②尾数相除：[Sx]补=11,000000 [Sy]补=11.100000 [-Sy]补=00.100000

补码加减交替法

|  |  |  |
| --- | --- | --- |
| z被除数（余数） | 商 | 操作 |
| 11.000000  +11.100000 | 0.000000 | z、Sy异号  +[Sy]补 |
| 10.100000  01.000000  +00.100000 | 1. | 同号，上商1  1<-  +[-Sy]补 |
| 01.100000  11.000000  +11.100000 | 1.0 | 异号，上商0  1<-  +[Sy]补 |
| 10.100000  01.000000  +00.100000 | 1.01 | 同号，上商1  1<-  +[-Sy]补 |
| 01.100000  11.000000  +11.100000 | 1.010 | 异号，上商0  1<-  +[Sy]补 |
| 10.100000  01.000000  +00.100000 | 1.0101 | 同号，上商1  1<-  +[-Sy]补 |
| 01.100000  11.000000  +11.100000 | 1.01010 | 异号，上商0  1<-  +[Sy]补 |
| 10.100000 | 1.010101 | 末位恒置1 |

[Sx÷Sy]补=1.010101

③规格化11,111; 11.010101已经是规格化数

④舍入：无需

⑤溢出：无

**最终结果为x÷y=11,001; 11.101011=2-1×(-43/64)**

(7)3.3125+6.125=53/16+49/8=22×53/64+23×49/64

[x] 阶补尾补=00,010; 00.110101 [y] 阶补尾补=00,011; 00.110001

①对阶：[x]阶补尾补= 00,010; 00.110101= 00,011; 00.011010

②尾数求和：00.011010 + 00.110001 = 01.001011

③规格化：00,011; 01.001011 = 00,100; 00.100101

④舍入：无需

⑤溢出：无

**最终结果为x+y=** **00,100; 00.100101=24×37/64**

(8)14.75-2.4375=59/4-39/16=24×59/64-22×39/64

[x] 阶补尾补=00,100; 00.111011 [y] 阶补尾补=00,010; 00.100111

①对阶：[y]阶补尾补= 00,010; 00.100111= 00,100; 00.001001

②尾数相减：00.111011 - 00.001001 = 00.111011+11.110111=00.110010

③规格化：00,100; 00.110010 已经是规格化数

④舍入：无需

⑤溢出：无

**最终结果为x-y=** **00,100; 00.110010=24×25/32**

**6.31**

若采用双重分组跳跃进位链

完成加法总时间=4×2.5ty=10ty=300ns=0.3μs < 0.6μs

进位链框图及电路框图：

