Cálculo Numérico - IME/UERJ

Gabarito - Lista de Exercícios 1 - Aritmética de ponto flutuante

1. (a) 19

(d) 1,5

(g) 12,25

(b) 226

- (e) 1,59375
- (h) 0,328125

(c) 65

- (f) 12,625
- (i) 0,890625

2. (a) 10111

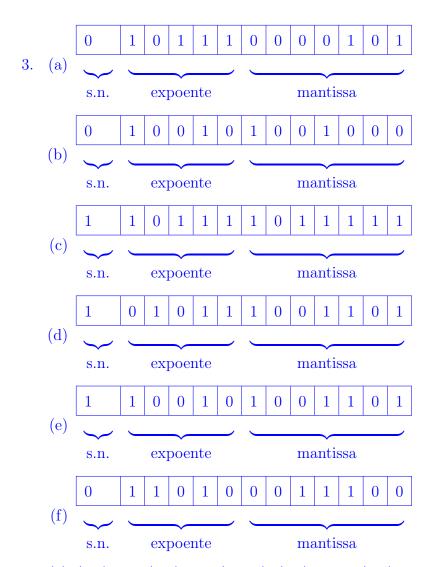
(d) 10,1

(g) $1010,00\overline{0011}$

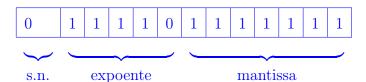
- (b) 11111111
- (e) $0.0\overline{0011}$
- (h) 111111,11001111010111000011 (com 20 casas)

- (c) 101000110111
- (f) $11,\overline{1100}$

(i) $0,\overline{1100}$

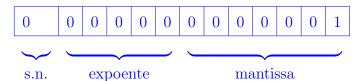


- 4. (a) (3-a) 266; (3-b) 12,5 (exato); (3-c) -446; (3-d) 0,10009765625 (3-e) -12,8125 (3-f) 2496
 - (b) Maior número positivo



 $1,11111111 \times 2^{15} = (65280)_{10}$

Menor número positivo (o número positivo mais próximo de zero está na forma desnormalizada)



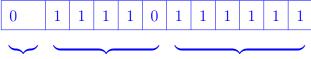
 $0,0000001 \times 2^{-14} = 2^{-21} \approx 4,7684 \times 10^{-7}$

- (c) 100,5
- (d) 19,875
- (e) $m = 1,1001100 \times 2^4$ (exato $E_{abs} = E_{rel} = 0$); $n = 1,1110001 \times 2^6 = 120,5$ ($E_{abs} = 0,25$, $E_{rel} \approx 2,0790 \times 10^{-3}$); $p = 1,0100000 \times 2^1$ (exato - $E_{abs} = E_{rel} = 0$); $a = 1,1100110 \times 2^8 = 460$ ($E_{abs} = 0,25$, $E_{rel} \approx 5,4318 \times 10^{-4}$); $b = 1,1100010 \times 2^8 = 452$ ($E_{abs} = 1,25$, $E_{rel} \approx 2,773 \times 10^{-3}$).
- 5. (a) Menor número positivo (o número positivo mais próximo de zero está na forma desnormalizada)



 $0.000001 \times 2^{-14} = 2^{-20} \approx 9.5367 \times 10^{-7}$

Maior número positivo



s.n. expoente

mantissa

$$1,111111 \times 2^{15} = (2 - 2^{-6}) \times 2^{15} = 65024$$

- (b) $e \approx 10,000000 \times 2^{-6} = 2^{-5} = 0,03125.$
- (c) $1,000101 \times 2^2 = (100,0101)_2 = 4,3125$.
- (d) $1,001111 \times 2^6 = (1001111)_2 = 79$.
- (e) $(0,8)_{10} = (0,110011001100...)_2 = 1,100110 \times 2^{-1}$ $(5)_{10} = (101)_2 = 1,010000 \times 2^2$ $0,8 \times 5 = 1,11111111 \times 2^1 \approx 10,000000 \times 2^1 = 1,000000 \times 2^2 = 4,0.$