Lista 1 - Cálculo Numérico [exercício de 1 a 4]

Author: Thales E A Menato

---

1 (a) $27_{(10)}$

27 |2
1 13 |2
1 6 |2
0 3 |2
1 1 |2
1 0

$11011_{(2)} = 27_{(10)}$

(b) $2345_{(10)} = 100100101001_{(2)}$

2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
2048	1024	512	256	128	64	32	16	8	4	2	1
1	0	0	1	0	0	1	0	1	0	0	1

256 + 48 = 304 + 32 = 336 + 8 = 344

(c) $1958_{(10)} = 11110100110_{(2)}$

2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1024	512	256	128	64	32	16	8	4	2	1
1	1	1	1	0	1	0	0	1	1	0

1024 + 512 = 1536 + 256 = 1792 + 128 = 1920 + 32 = 1952

(d) $33.56_{(10)} = 100001.10001111101_{(2)}$

2^5	2^4	2^3	2^2	2^1	2^0
32	16	8	4	2	1
1	0	0	0	0	1

$33_{(10)} = 100001_{(2)}$

$0,56 \times 2 = 1,12$
$0,12 \times 2 = 0,24$
$0,24 \times 2 = 0,48$
$0,48 \times 2 = 0,96$
$0,96 \times 2 = 1,92$
$0,92 \times 2 = 1,84$
$0,84 \times 2 = 1,68$
$0,68 \times 2 = 1,36$
$0,36 \times 2 = 0,72$
$0,72 \times 2 = 1,44$
...

(e) $2012_{(10)} = 11111011100_{(2)}$

2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1024	512	256	128	64	32	16	8	4	2	1
1	1	1	1	1	0	1	1	1	0	0

1024 + 512 = 1536 + 256 = 1792 + 128 = 1920 + 64 = 1984

1984 + 16 = 2000

(f) $0.4_{(10)} = 0.0110011001100_{(2)}$

$0,4 \times 2 = 0,8$
$0,8 \times 2 = 1,6$
$0,6 \times 2 = 1,2$
$0,2 \times 2 = 0,4$
$0,4 \times 2 = 0,8$
... repetição

(2) (a) $11111011100_{(2)} = 2012_{(10)}$

2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1024	512	256	128	64	32	16	8	4	2	1
1	1	1	1	1	0	1	1	1	0	0

1024
512
256
128
64
16
8
4
2012(10)

(b) $111.0111_{(2)} = 15.4375_{(10)}$

2^3	2^2	2^1	2^0		2^{-1}	2^{-2}	2^{-3}	2^{-4}	
8	4	2	1		0,5	0,25	0,125	0,0625	
1	1	1	1	$\Rightarrow 15_{(10)}$	0	1	1	1	$\Rightarrow 0,4375_{(10)}$

(c) $11.11_{(2)} = 3.75_{(10)}$

$1\times2^0 + 1\times2^1 = 3_{(10)}$ $\quad 1\times2^{-1} + 1\times2^{-2} = 0,5+0,25 = 0,75_{(10)}$

(d) $1010101_{(2)} = 85_{(10)}$

$1\times2^0 + 0\times2^1 + 1\times2^2 + 0\times2^3 + 1\times2^4 + 0\times2^5 + 1\times2^6 = 1+4+16+64 = 85_{(10)}$

(3) (a) $0.1267899 = 0,1268$

(b) $23.456797 = 23.4568$

(c) $11.233333 = 11.2333$

(d) $5.897234 = 5.8972$

(4) (a) $E_{abs} = |a_{ex} - a_{aprox}|$

neste caso consideraremos como valor exato: $a_{ex} = 384000$
e como valor aproximado $a_{aprox} = 402500$

$E_{abs} = |384000 - 402500| = 18500$

(b) $E_{rel} = \frac{|E_{Abs}|}{|a_{ex}|} = \frac{18500}{384000} = 0,048177 = 4,8\%$