2 PROVA DE MÉTODOS NUMÉRICOS

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Variante C

1-

2ª PROVA DE MÉTODOS NUMÉRICOS EM ENGENHARIA

18014550 9

PROVA C

1.

X	Y	X^2	Y^2	XY
0.76	0.32	0.5776	0.1024	0.2432
1.44	0.38	2.0736	0.1444	0.5472
3.36	1.92	11.2896	3.6864	6.4512
4.84	2.26	23.4256	5.1076	10.9384
5.70	3.44	32.49	11.8336	19.608
7.00	4.00	49	16	28
9.86	3.92	97.2196	15.36	38.6512
32.96	16.24	216,076	52.2344	104.4392

$Y = A + BX$

$$a_1 = \frac{n S_{xy} - S_x \cdot S_y}{n S_{xx} - (S_x)^2} \qquad a_0 = \frac{S_{xx} S_y - S_{xy} S_x}{n S_{xx} - (S_x)^2}$$

$$a_1 = \frac{7 \cdot 104.4392 - 32.96 \cdot 16.24}{7 \cdot 216.076 - (32.96)^2} \qquad a_0 = \frac{216.076 \cdot 16.24 - 104.4392 \cdot 32.96}{7 \cdot 216.076 - (32.96)^2}$$

$$a_1 = \frac{731.0744 - 535.2704}{1.512,532 - 1086,3616} \qquad a_0 = \frac{3509,07424 - 3442,316032}{1512,532 - 1086,3616}$$

$a_1 = \frac{195,804}{4126,1704} = 0,4595$ $a_0 = \frac{66.758209}{4126.1704} = 0.1566$

$y = \frac{mx}{b+x}$ $a_1 = \frac{b}{m}$ $a_0 = \frac{1}{m}$

$a_0 = \frac{1}{m}$ $\therefore$ $0.1566 = \frac{1}{m}$ $\therefore$ $0.1566 \cdot m = 1$

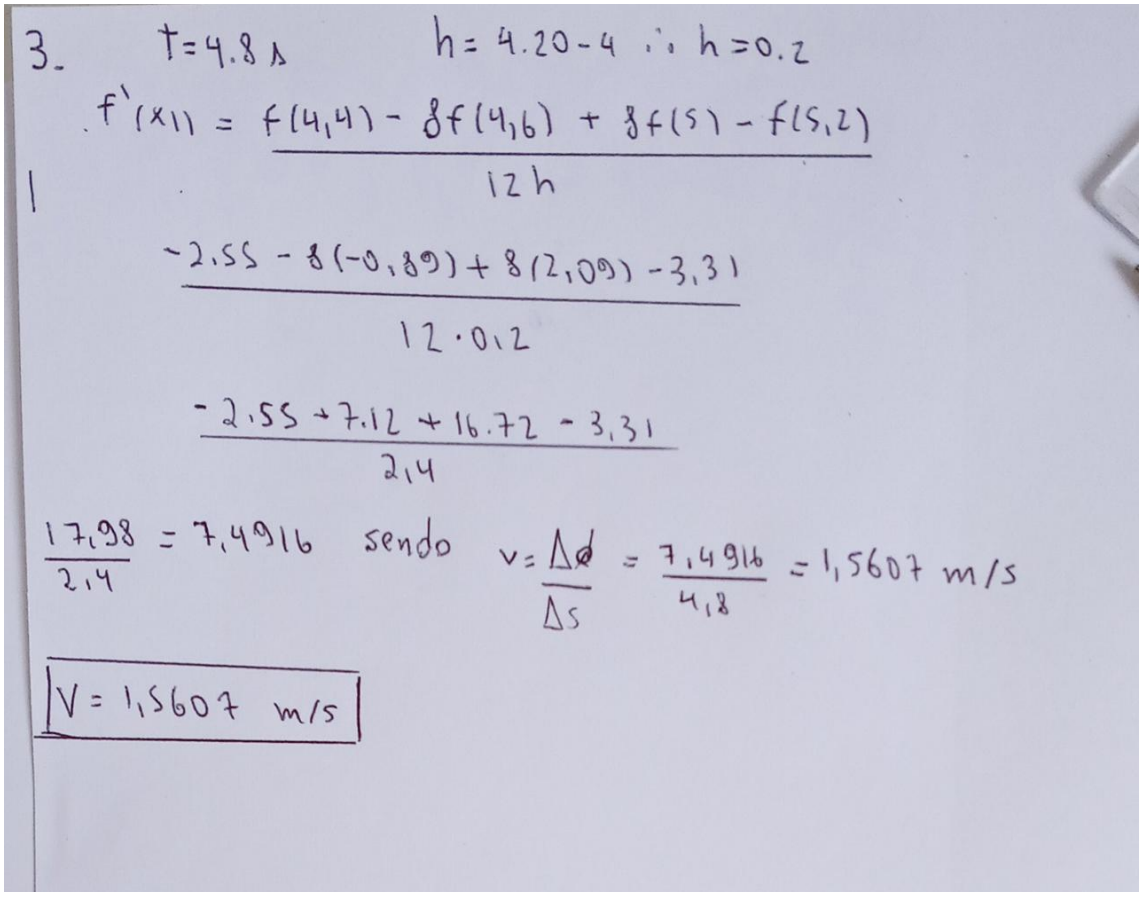
$m = 1 / 0.1566$

$\boxed{m = 6.386}$

$a_1 = \frac{b}{m}$ $\therefore$ $0,4595 = \frac{b}{6.386}$

$\boxed{b = 2.934}$

3-



3. $t = 4.8\ s$ $\quad h = 4.20 - 4 \therefore h = 0.2$

$$f'(x_1) = \frac{f(4,4) - 8f(4,6) + 8f(5) - f(5,2)}{12h}$$

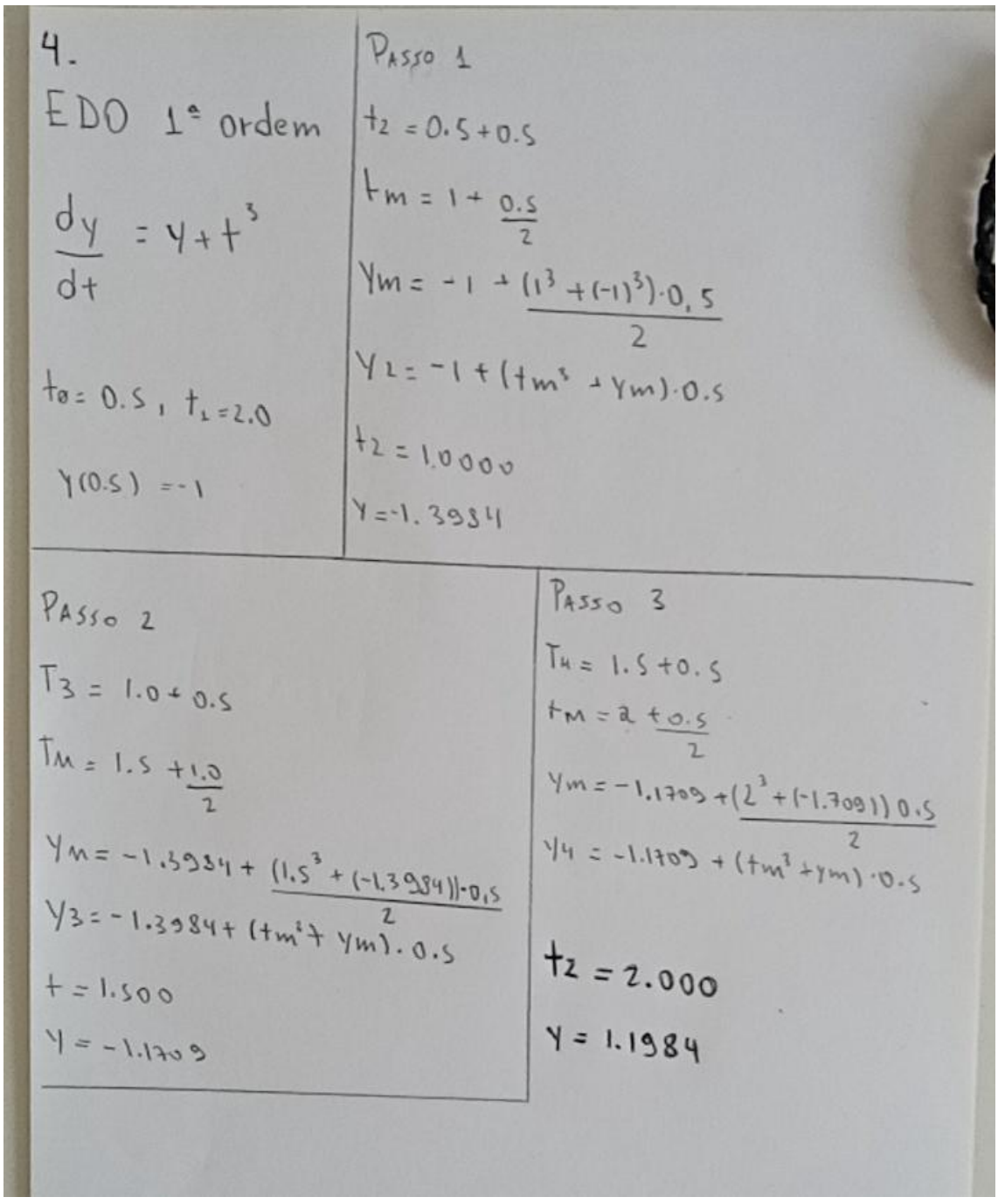
$$\frac{-2.55 - 8(-0,89) + 8(2,09) - 3,31}{12 \cdot 0,2}$$

$$\frac{-2.55 + 7.12 + 16.72 - 3,31}{2,4}$$

$\frac{17,98}{2,4} = 7,4916$ sendo $v = \frac{\Delta s}{\Delta t} = \frac{7,4916}{4,8} = 1,5607\ m/s$

$\boxed{V = 1,5607\ m/s}$

4-



4.

EDO 1ª ordem

$\frac{dy}{dt} = y + t^3$

$t_0 = 0.5$, $t_1 = 2.0$

$y(0.5) = -1$

Passo 1

$t_2 = 0.5 + 0.5$

$t_m = 1 + \frac{0.5}{2}$

$y_m = -1 + \frac{(1^3 + (-1)^3) \cdot 0,5}{2}$

$y_2 = -1 + (t_m^3 + y_m) \cdot 0.5$

$t_2 = 1.0000$

$y = -1.3984$

Passo 2

$T_3 = 1.0 + 0.5$

$T_M = 1.5 + \frac{1.0}{2}$

$y_m = -1.3984 + \frac{(1.5^3 + (-1.3984)) \cdot 0,5}{2}$

$y_3 = -1.3984 + (t_m^3 + y_m) \cdot 0.5$

$t = 1.500$

$y = -1.1709$

Passo 3

$T_4 = 1.5 + 0.5$

$t_M = 2 + \frac{0.5}{2}$

$y_m = -1.1709 + \frac{(2^3 + (-1.7091)) 0.5}{2}$

$y_4 = -1.1709 + (t_m^3 + y_m) \cdot 0.5$

$t_2 = 2.000$

$y = 1.1984$