

2. (a) Seja  $x = 0,1 \cdot 10^0$  e  $y = 0,5 \cdot 10^6$

temos  $\bar{x} = x$  e  $\bar{y} = y$

utilizamos  $x \rightarrow \bar{x}$   
 $y \rightarrow \bar{y} \rightarrow +: \bar{x} + \bar{y} \rightarrow \overline{\bar{x} + \bar{y}}$

$$\bar{x} + \bar{y} = 0.00000001 \cdot 10^6 + 0.500000 \cdot 10^6$$

$$= 0.50000001 \cdot 10^6$$

$$\Rightarrow \overline{\bar{x} + \bar{y}} = 0.500000 \cdot 10^6$$

Seja  $z = x + y$ ,  $ER_z = \frac{(x + y) - (\bar{x} + \bar{y})}{\bar{x} + \bar{y}}$

$$= \frac{0.00000001 \cdot 10^6}{0.5 \cdot 10^6} = \frac{10^{-7}}{0.5} = \frac{1}{0.5} \cdot 10^{-7}$$

$$= 2 \cdot 10^{-7}$$

(b) Na máquina com  $t=5$

$$\bar{A} = \begin{pmatrix} -0.20000 \cdot 10^{-6} & 0.50000 \cdot 10^0 & 0.50000 \cdot 10^0 \\ 0.20000 \cdot 10^0 & 0.10000 \cdot 10^6 & 0.30000 \cdot 10^0 \end{pmatrix}$$

$m = -10^6$

$$\leadsto \begin{pmatrix} -0.20000 \cdot 10^{-6} & 0.50000 \cdot 10^0 & 0.50000 \cdot 10^0 \\ 0 & 0.50000 \cdot 10^6 & 0.30000 \cdot 10^0 \end{pmatrix}$$

$\Rightarrow x_2 = 0.10000 \cdot 10^1 = 1$  e  $x_1 = 0$

$$x_b = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$