Questoã 3

$\begin{cases} a : 7 \\ b = 3 \\ c = 3 \end{cases}$

a)

- polinomio caracteristico

$A \Rightarrow \quad (sI - A) = \begin{bmatrix} s+a & 0 & 0 \\ 0 & s+b & 0 \\ 0 & 0 & s+c \end{bmatrix}$

$\det(sI - A) = (s+a)(s+b)(s+c)$

$s^3 \ldots = (s^2 + bs + as + ab)(s+c)$

s^3

\# polinomio de grau 3

$\cdot\ s^3 + bs^2 + as^2 + abs + cs^2 + bcs + a.cs + abc$

$= s^3 + (b + a + c)s^2 + (ab + bc + ac)s + abc$

$= s^3 + (3 + 7 + 3)s^2 + (7.3 + 3.3 + 7.3)s + 7.3.3$

$= \underbrace{s^3}_{a_3} + \underbrace{13s^2}_{a_2} + \underbrace{51s}_{a_1} + \underbrace{63}_{a_0}$

$\left.\begin{array}{lll} s^3 & 1 & 51 \\ s^2 & 13 & 63 \\ s^1 & +46{,}15 & \\ s^0 & +63 & \end{array}\right\}$ \# Todos coeficientes soõ positivos

$b_{n-1} = \frac{-1}{13}\begin{bmatrix} 1 & 51 \\ 13 & 63 \end{bmatrix}$

$= \frac{1}{13}\left[63 - (51.13)\right]$

$= \frac{600}{13}$

$= 46{,}15$

$c_{n-1} = \frac{-1}{46{,}15}\begin{bmatrix} 13 & 63 \\ 46.15 & 0 \end{bmatrix} = \frac{-1}{\cancel{46{,}15}}\left[-63.\cancel{46{,}15}\right] = +63$

\# como todos coeficientes soõ positivos
Logo, isso é condiçoõ suficiente para
o sistema ser <u>estável</u>

$\left.\begin{array}{l} a_3 > 0 \\ a_2 > 0 \\ a_1 > 0 \\ a_0 > 0 \end{array}\right.$

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