Resolução da prova 2 de SSIS1 2017-2, Turma X.

Grupo – Rai Henrique Yamasaki Rodrigues MATRICULA: 11511EAU008.

Matriculas Utilizadas para constantes : 11511EAU008, 10011EEL034 e 10021EBI075.
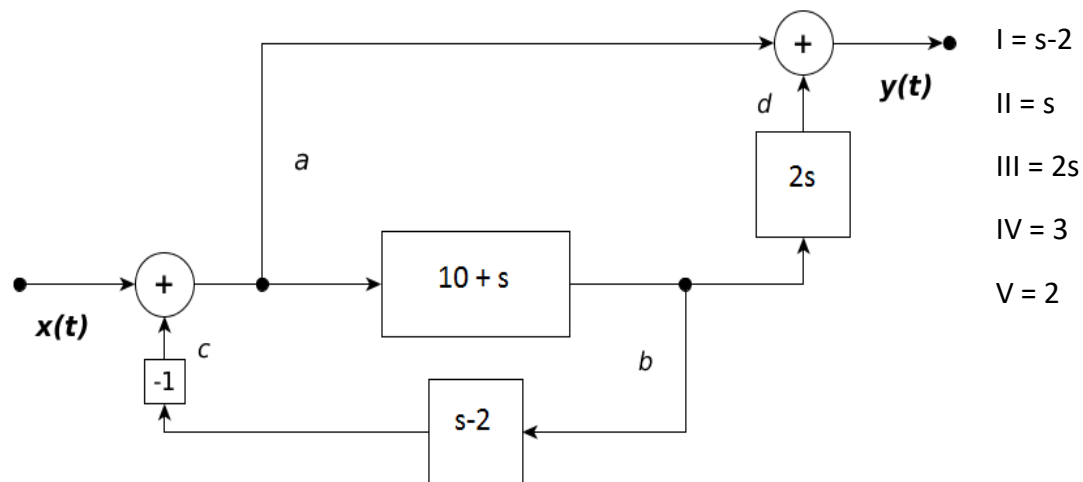
QUESTÃO 1.

FEITA NO MAXIMA.

$$MAT1: 11111EAU008, KANO1: 6, KCUR1: 1, KNUM1: 9$$
$$MAT2: 10021EEL034, KANO2: 5, KCUR2: 4, KNUM2: 8$$
$$MAT3: 10011EBI075, KANO3: 4, KCUR3: 2, KNUM3: 4$$

QUESTÃO 2.

LETRA A.

$$Y(s) = (2s)(10 + s)\left(\frac{X(s)}{1 + (s - 2)(10 + s)}\right) + \left(\frac{X(s)}{1 + (s - 2)(10 + s)}\right)$$

$$\frac{Y(s)}{X(s)} = (2s)(10 + s)\left(\frac{1}{1 + (s - 2)(10 + s)}\right) + \left(\frac{1}{1 + (s - 2)(10 + s)}\right)$$

Input interpretation:

simplify $(2\,s)(10+s) \times \dfrac{1}{1+(s-2)(10+s)} + (10+s) \times \dfrac{1}{1+(s-2)(10+s)}$

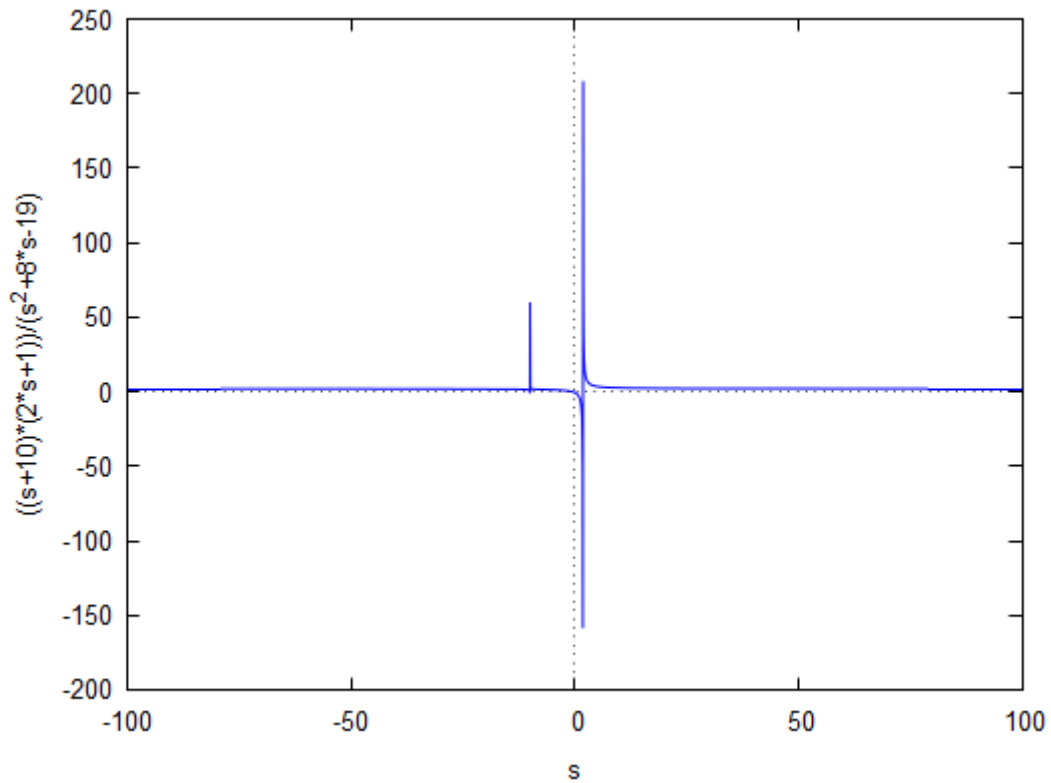Results: More forms   ☑ Step-by-step solution

$$\frac{(2\,s + 1)(s + 10)}{s^2 + 8\,s - 19}$$

$$H(s) = \left(\frac{(2s+1)(s+10)}{s^2+8s-19} \right) = \left(\frac{2s^2+21s+10}{s^2+8s-19} \right)$$

(%i7)   wxplot2d(H(s),[s,−100,100]);

Input:

$$\mathcal{L}_s^{-1}\left[\frac{2\,s^2+21\,s+10}{s^2+8\,s-19} \right](t)$$
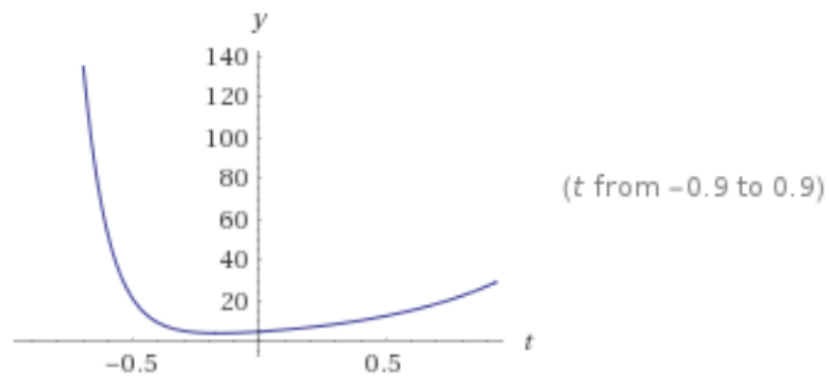
Open code ⟳

$\mathcal{L}_s^{-1}[f(s)](t)$ is the inverse Laplace transform of $f(s)$ with real variable t

Result:

$$\frac{1}{10}\left(20\,\delta(t) - 4\,\sqrt{35}\ e^{\left(-4-\sqrt{35}\right)t} + 25\,e^{\left(-4-\sqrt{35}\right)t} + 4\,\sqrt{35}\ e^{\left(\sqrt{35}-4\right)t} + 25\,e^{\left(\sqrt{35}-4\right)t} \right)$$

⟳

$\delta(x)$ is the Dirac delta function

Plot:

(t from −0.9 to 0.9)

LETRA B

Input:

$$s^2 + 8s - 19 = 0$$

Solutions:

[Approximate forms] [☑ Step-by-step solution]

$$s = -4 - \sqrt{35}$$

$$s = \sqrt{35} - 4$$

LETRA C

Input:

$$(2s + 1)(s + 10) = 0$$

Solutions:

[Decimal forms]

$$s = -10$$

$$s = -\frac{1}{2}$$

QUESTÃO 3.

1)

$L1 = 3 \cdot \left(\frac{2}{1.2}\right) = 3H$

$C1 = 1/(5 \times 4) = 0{,}05F$

$R1 = 9 \times 4 = 36\,\Omega$ $X(\lambda)$

$R2 = 9\,\Omega$

$R3 = 36\,\Omega$

MA: $X(\lambda) = 3\lambda(I_A - I_B) + 36(I_A - I_C)$ ①

MB: $3\lambda(I_A - I_B) - \dfrac{20}{\lambda}(I_B) - 5(I_B - I_C) = 0$ ②

MC: $36(I_A - I_C) + 5(I_B - I_C) = Y(\lambda)$ ③

mas → $Y(\lambda) = 36 \cdot I_C$ e $X(\lambda) = \dfrac{20}{\lambda} I_B + 36 I_C$

NÃO CONSIGO ACHAR AS CORRENTES DE MALHA.

$H(\lambda) = \dfrac{Y(\lambda)}{X(\lambda)} = \dfrac{36 I_C}{3\lambda(I_A - I_B) + 36(I_A - I_C)}$

2) Transformada da Entrada

(%i1) $V(t):= 10 \cdot \exp(-60 \cdot t) \cdot \sin(120 \cdot ((\%pi) \cdot t)) \cdot \text{unit\_step}(t);$

(%o1) $V(t) := 10\exp\big((-60).t\big).\sin\big(120.(\%pi.t)\big).\text{unit\_step}(t)$

(%i4) $\text{laplace}(V(t),t,s);$

(%o4) $\dfrac{1200\pi}{s^2 + 120\pi + 14400\pi^2 + 3600}$