

Aula 08-09-2022 aula prática

Usando o Octave Online(Alternativa ao Matlab)

Prática

- Transformada de Laplace
- Transformada inversa de Laplace

- Transformada Z

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Formato Padrão Times New Roman 12 pt

NOME:

1. Aplique a transformada de Laplace para representar as Fts abaixo no domínio da frequência, no plano s.

a) $f(t) = 2t + 3e^{-t}$;
b) $g(t) = (2/3)t + t/2$;
c) $g(t) = 2\exp(-2t)$;
d) $k(t) = 2\exp(-3t) + 3t$;
e) $k(t) = 2\exp(-3t) + 5\exp(-2t)$;

Comandos do Matlab: `syms t => f=2*t+3*t; => laplace(f)`
Comandos do Octave: `pkg load symbolic => syms t => f=2*t+3*t; => laplace(f)`

2. Aplique a transformada de Laplace inversa para representar as Fts no domínio do tempo

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$$f = 2t + 3t$$

$$f = 5t$$

$$f(t) = 5 \times t$$

$$f(s) = \frac{5}{s^2}$$

$$\underline{\underline{g(t) = 2 \times e^{-2t}}}$$

$$g(t) = \frac{(2 \times t)}{3} + \frac{t}{2};$$

$$g(s) = \frac{2}{3} \cdot \frac{1}{s^2} + \frac{1}{2} \cdot \frac{1}{s^2}$$

$$g(s) = \frac{4 + 3}{6 \times s^2} \Rightarrow \boxed{g(s) = \frac{7}{6 \cdot s^2}}$$

Comandos do Octave: `pkg load symbolic => syms t => f=2*t+3*t; => laplace(f)`

2. Aplique a transformada de Laplace inversa para representar as Fts no domínio do tempo.

- a) $F(s) = 2/(s+4);$
- b) $F(s) = 1/((s+1)*(s+2));$
- c) $K(s) = 3/((s+2)*(s+3));$
- d) $H(s) = 1/(s+1) + 3/(s+2);$
- e) $G(s) = 2/s^2 + 3/s^3;$
- f) $F(s) = 2/((s+1)*(s+2)*(s+3));$

Comandos do Matlab: `syms s -> F = 2/(s+4); => ilaplace(F)`

Comandos do Octave: `pkg load symbolic => F = 2/(s+4); => ilaplace(F)`

→ TRANSF. DE LAPLACE

→ TRANSF. INVERSA DE LAPLACE

→ TRANSFORMADA Z.

B) $F(s)$

A=

B=

$F(s) =$

$$F(s) = \frac{2}{s+4} \Rightarrow f(t) = 2 \cdot e^{-4t}$$

$$c) K(s) = \frac{3}{(s+2)(s+3)} = \frac{A}{s+2} + \frac{B}{s+3}$$

$$A = \frac{3}{2+3} \Big|_{s=-2} \Rightarrow A = 3$$

$$B = \frac{3}{s+2} \Big|_{s=-3} \Rightarrow B = -3$$

$$K(s) = \frac{3}{s+2} - \frac{3}{s+3}$$

$$k(t) = 3 \cdot e^{-2t} - 3 \cdot e^{-3t}$$

$$k(t) = 3 \cdot (e^{-2t} - e^{-3t})$$

$$a) F(s) = \frac{1}{(s+1)(s+2)} = \frac{A}{s+1} + \frac{B}{s+2}$$

$$A = \frac{1}{s+2} \Big|_{s=-1} \Rightarrow \underline{A = 1}$$

$$B = \frac{1}{s+1} \Big|_{s=-2} \Rightarrow B = -1$$

$$F(s) = \frac{1}{s+1} - \frac{1}{s+2} \Rightarrow \underline{f(t) = e^{-t} - e^{-2t}}$$

Transformada de Laplace - LibreOffice Writer

Comandos do Octave: pkg load sym toolbox; syms s; f = tf([0 3],[1 4]); fz = c2d(f,1,'zoh')

3. Aplique a transformada Z para representar as FTs abaixo no plano Z.

- a) $F(s) = 3/(s+4)$;
- b) $F(s) = 2/((s+3)*(s+2))$;
- c) $K(s) = 3/((s+2)*(s+3))$;
- d) $H(s) = 1/(s+1) + 3/(s+2)$;
- e) $G(s) = 2/s^2 + 3/s^3$;
- f) $F(s) = 2/(s^2 + 3s + 2)$;

Comandos do Matlab: syms s => f = tf([0 3],[1 4]) => fz = c2d(f,1,'zoh')

Comandos do Octave: pkg load control => syms s => f = tf([0 3],[1 4]) => fz = c2d(f,1,'zoh')

4. Aplique a transformada Z inversa para representar as FTs abaixo no tempo

CONV. AD

ACE

DE LAPLACE

$g(s) = \frac{2}{s+4}$

$g_s = tf([0 2],[1 4])$

$K(z) = \frac{2 \times z}{z - e^{-2T}}$

T_s

OCTAVE

- ⇒ TRANSF. DE LAPLACE
- ⇒ TRANSF. INVERSA DE
- ⇒ TRANSFORMADA Z

