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```
clc; clearvars; close all;
```

Exercício 1

```
% a - H1(s) = (s - 1) / (s^2 + 3s + 2)
num1 = [1 -1];
den1 = [1 3 2];
H1_tf = tf(num1, den1);

% b - H2(s) = s / (s^3 + 9s^2 + 26s + 24)
num2 = [1 0];
den2 = [1 9 26 24];
H2_tf = tf(num2, den2);

% c - H3(s) = 1 / (2s^2 + 10s + 8)
num3 = [1];
den3 = [2 10 8];
H3_tf = tf(num3, den3);

% d - H4(s) = (s + 2) / (s^3 + 2s^2 + s)
num4 = [1 2];
den4 = [1 2 1 0];
H4_tf = tf(num4, den4);
```

Exercício 2

```
% a - H1(s) = (s - 1) / ( (s + 1)*(s + 2) )
zeros1 = [1];
polos1 = [-1 -2];
k1 = 1;
H1_zpk = zpk(zeros1, polos1, k1);

% b - H2(s) = s / ( (s + 2)*(s + 3)*(s + 4) )
zeros2 = [0];
polos2 = [-2 -3 -4];
k2 = 1;
H2_zpk = zpk(zeros2, polos2, k2);

% c - H3(s) = 1 / 2( (s + 1)*(s + 4) )
zeros3 = []; %não zera com nenhum número no numerador
```

```
polos3 = [-1 -4];
k3 = 1/2;
H3_zpk = zpk(zeros3, polos3, k3);

% d - H4(s) = (s + 2) / s( (s + 1)^2 ) = (s + 2) / s( (s + 1)*(s + 1) )
zeros4 = [-2];
polos4 = [0 -1 -1];
k4 = 1;
H4_zpk = zpk(zeros4, polos4, k4);
```

Exercício 3

```
m = 1;
b = 0.2;
k = 0.5;

% H(s) = 1 / (ms^2 + bs + k) = 1 / (1s^2 + 0.2s + 0.5)
num = [1];
den = [m b k];
H = tf(num, den);

t = linspace(0, 50, 1000);

% a - x(t) = u(t)
u = zeros(size(t));
u(t >= 0) = 1;
x1 = u;
y1 = lsim(H, x1, t);

% b - x(t) = cos(0.7t)
x2 = cos(0.7 * t);
y2 = lsim(H, x2, t);
```

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