

14.19 Find $H(s) = I_o/V_i$ for the circuit of Figure P14.19; hence, find the critical frequencies. Don't forget to check.

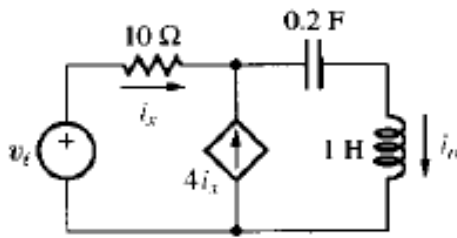


Figure P14.19

```
clc, clear, close all
format short g
syms s vi ix i0

c = 0.2;
l = 1;

z1 = 10;
z2 = 1/(s*c);
z3 = s*l;
```

Realizamos un analisis de mallas, debido a que tenemos una fuente dependiente, se usa una super malla con su ecuacion de restricci3n

```
sm = simplify(-vi + z1*ix + z2*i0 + z3*i0 == 0)
```

$$sm = i_0 s^2 + 10 i_x s + 5 i_0 = s v_i \wedge s \neq 0$$

```
ec_restric = simplify(i0 - ix == 4*ix)
```

$$ec_restric = i_0 = 5 i_x$$

reemplazamos ix en la ecuacion de super malla

```
ix = i0/5;
sm = simplify(-vi + z1*ix + z2*i0 + z3*i0 == 0)
```

$$sm = s v_i = i_0 (s^2 + 2 s + 5) \wedge s \neq 0$$

despejamos el factor $i_0 / v_i = H(s)$

```
h = s/(s^2+2*s+5)
```

$$h =$$

$$\frac{s}{s^2 + 2 s + 5}$$

definimos la funcion de transferencia y encontramos los polos y zeros

```
h = tf([1 0],[1 2 5]) %funcion de transferencia
```

```
h =
```

$$\frac{s}{s^2 + 2s + 5}$$

Continuous-time transfer function.

```
z = zero(h)
```

```
z =
```

0

```
p = pole(h)
```

```
p = 2×1 complex
    -1 + 2i
    -1 - 2i
```