

ANALISI DEI SISTEMI

II Pre-same 2006

Soluzione

ESERCIZIO 2

```
%%% Testo A
num_2a = 6      6
den_2a = 2      4      40
Guadagno di Bode: K = 0.15, K_db = -16
Zero reale: z = -1      tau = 1
Coppia di poli complessi:
p,p' = -1 +/- j4.3589,
omega_n = 4.4721, zeta = 0.22
omega_s = 2.6724, omega_d = 7.4838
Delta M_db = 7
```

```
%%% Testo B
num_2a = 6      42
den_2a = 2      3      21
Guadagno di Bode: K = 2, K_db = 6
Zero reale: z = -7      tau = 0.1429
Coppia di poli complessi:
p,p' = -0.7500 +/- j3.1524
omega_n = 3.2404, zeta = 0.23
omega_s = 1.9017, omega_d = 5.5214
Delta M_db = 7
```

ESERCIZIO 3

```
%%% Testo A
A_a = [ -1, 2]
      [ r, -2]
det_a = s^2+3*s+2-2*r
A_a = -1      2
      1      -2
B_a = 1
      2
C_a = 0      1
D_a = 1
W_a = (3+5*s+s^2)/s/(s+3)
```

```
%%% Testo B
A_b = [ -1, r]
      [ 2, -2]
det_b = s^2+3*s+2-2*r
A_b = -1      1
      2      -2
B_b = 2
      3
C_b = 1      0
D_b = 2
W_b = (8*s+7+2*s^2)/s/(3+s)
```

ESERCIZIO 4

U = 3/s

```
%%% Testo A
x0_a = 1
      2
```

$$A_a = \begin{bmatrix} -1 & 2 \\ 0 & -2 \end{bmatrix}$$
$$ris_a = \begin{bmatrix} 1/(s+1), & 2/(s+1)/(s+2) \\ 0, & 1/(s+2) \end{bmatrix}$$
$$X_{l_a} = \begin{bmatrix} (s+6)/(s+1)/(s+2) \\ 2/(s+2) \end{bmatrix}$$
$$Y_{l_a} = 2/(s+2)$$
$$x_{l_a} = \begin{bmatrix} 5*exp(-t)-4*exp(-2*t) \\ 2*exp(-2*t) \end{bmatrix}$$
$$y_{l_a} = 2*exp(-2*t)$$
$$X_{f_a} = \begin{bmatrix} 3*(s+6)/s/(s+1)/(s+2) \\ 6/s/(s+2) \end{bmatrix}$$
$$Y_{f_a} = 3*(4+s)/s/(s+2)$$
$$x_{f_a} = \begin{bmatrix} 9-15*exp(-t)+6*exp(-2*t) \\ 3-3*exp(-2*t) \end{bmatrix}$$
$$y_{f_a} = 6-3*exp(-2*t)$$

%%% Testo B

```
x0_b = 2
      1
A_b = -1      0
      2      -2
ris_b = [ 1/(s+1), 0]
      [ 2/(s+1)/(s+2), 1/(s+2)]
```

$$X_{l_b} = \begin{bmatrix} 2/(s+1) \\ (5+s)/(s+1)/(s+2) \end{bmatrix}$$
$$Y_{l_b} = 2/(s+1)$$
$$x_{l_b} = \begin{bmatrix} 2*exp(-t) \\ 4*exp(-t)-3*exp(-2*t) \end{bmatrix}$$
$$y_{l_b} = 2*exp(-t)$$
$$X_{f_b} = \begin{bmatrix} 6/s/(s+1) \\ 3*(7+3*s)/s/(s+1)/(s+2) \end{bmatrix}$$
$$Y_{f_b} = 6*(s+2)/s/(s+1)$$
$$x_{f_b} = \begin{bmatrix} 6-6*exp(-t) \\ 21/2-12*exp(-t)+3/2*exp(-2*t) \end{bmatrix}$$
$$y_{f_b} = 12-6*exp(-t)$$

Diagramma di Bode (asintotico)

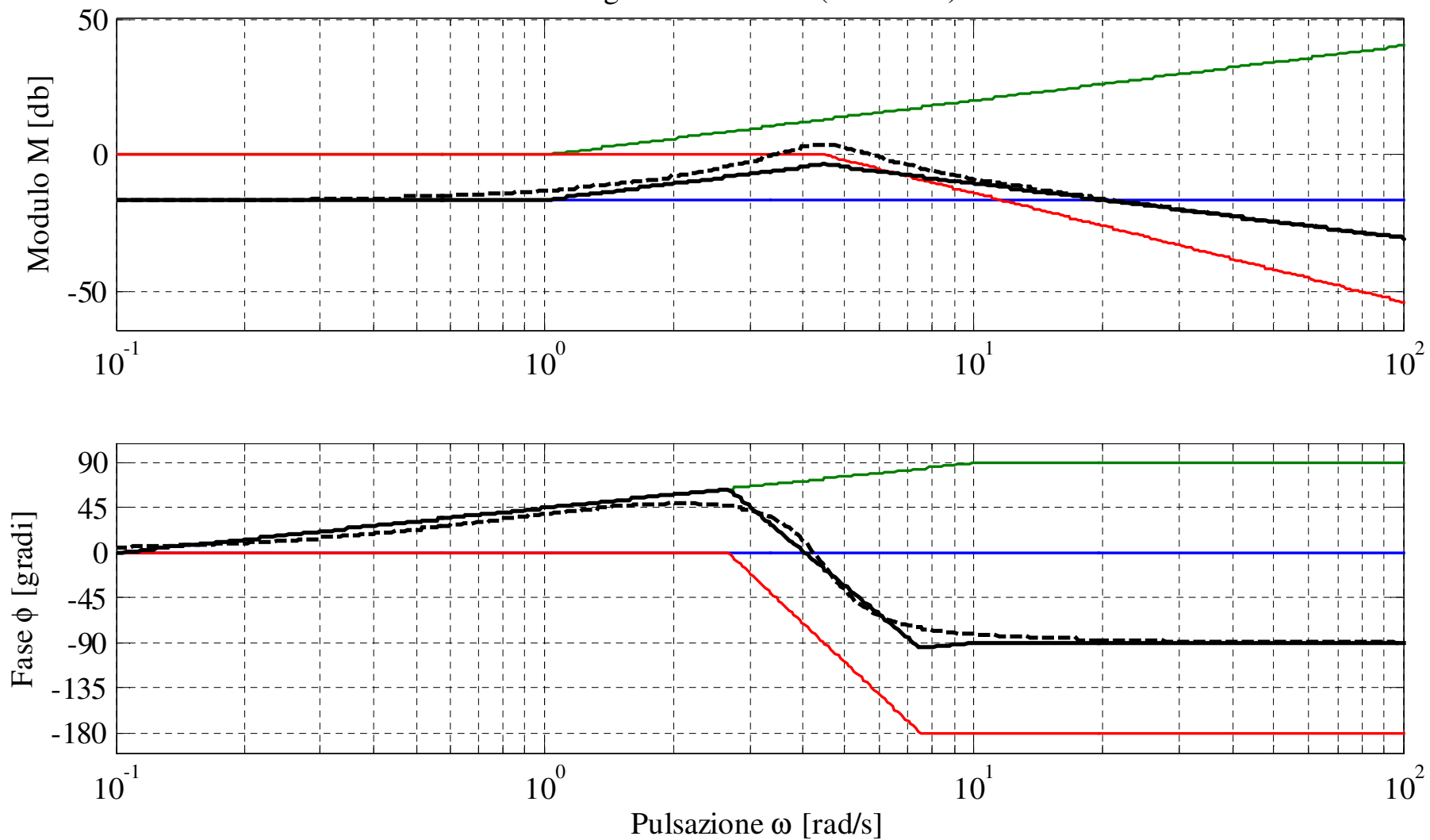


Diagramma di Bode (asintotico)

