

3 rhp, 2 lhp

4.

s^5	1	3	2
s^4	-1	-3	-2
s^3	-2	-3	ROZ
s^2	-3	-4	
s^1	-1/3		
s^0	-4		

Even (4): 4 $j\omega$; Rest(1): 1 rhp; Total (5): 1 rhp; 4 $j\omega$

9.

$$T(s) = \frac{240}{s^4 + 10s^3 + 35s^2 + 50s + 264}$$

s 4	1	35	264
s 3	10	50	0
s 2	30	264	0
s 1	-38	0	0
s 0	264	0	0

2 rhp, 2 lhp

10.

11.

$$T(s) = \frac{1}{4s^4 + 4s^2 + 1}$$

s 4	4	4	1	
s 3	16	8	0	ROZ
s 2	2	1	0	
s 1	4	0	0	ROZ
s 0	1	0	0	

Even (4): $4j\omega$

21.

$$T(s) = \frac{K(s+6)}{s^3 + 4s^2 + (K+3)s + 6K}$$

s^3	1	$3 + K$
s^2	4	$6K$
s^1	$3 - \frac{1}{2} K$	0
s^0	$6K$	0

Stable for $0 < K < 6$

Oscillation of 44.73 rad/s .

31.

$$T(s) = \frac{Ks^4 - Ks^2 + 2Ks + 2K}{(K+1)s^2 + 2(1-K)s + (2K+1)}$$

Since all coefficients must be positive for stability in a second-order polynomial, $-1 < K < \infty$;

$-\infty < K < 1$; $-1 < 2K < \infty$. Hence, $-\frac{1}{2} < K < 1$.