

```

figure(1)
w = 0:0.1:10
A = 10 * sqrt(w.^2 + 1)
dd = (13 -w.^2).^2 + 16 * w.^2
dd = sqrt(dd)
A = A./dd
re = 40 * w -10 * w.*w + 130
re = re./dd
im = 130 - 10.*w - 40 * w
im = im./dd
xlabel('\omega')
ylabel('|G(j\omega)|')
grid
plot(re,im)
x = atan(w) -atan(4 * w/(13 -w.^2))
%plot(w,x,'k')

xlabel('\omega')
ylabel('\phi(\omega)')
grid
figure(2)
sys = tf(10 * [1 1],[1 4 13])
subplot(121)
pzmap(sys)
grid
subplot(122)
nyquist(sys)
grid
figure(3)
subplot(211)
plot(w,A,'k')
grid
subplot(212)
plot(w,x,'k')
grid

```

w =

1 至 7 列

0	0.1000	0.2000	0.3000	0.4000	0.5000	0.6000
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8 至 14 列

0.7000	0.8000	0.9000	1.0000	1.1000	1.2000	1.3000
--------	--------	--------	--------	--------	--------	--------

15 至 21 列

1.4000	1.5000	1.6000	1.7000	1.8000	1.9000	2.0000
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22 至 28 列

2.1000	2.2000	2.3000	2.4000	2.5000	2.6000	2.7000
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29 至 35 列

2.8000	2.9000	3.0000	3.1000	3.2000	3.3000	3.4000
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36 至 42 列

3.5000	3.6000	3.7000	3.8000	3.9000	4.0000	4.1000
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43 至 49 列

4.2000	4.3000	4.4000	4.5000	4.6000	4.7000	4.8000
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50 至 56 列

4.9000	5.0000	5.1000	5.2000	5.3000	5.4000	5.5000
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57 至 63 列

5.6000	5.7000	5.8000	5.9000	6.0000	6.1000	6.2000
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64 至 70 列

6.3000	6.4000	6.5000	6.6000	6.7000	6.8000	6.9000
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71 至 77 列

7.0000	7.1000	7.2000	7.3000	7.4000	7.5000	7.6000
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78 至 84 列

7.7000	7.8000	7.9000	8.0000	8.1000	8.2000	8.3000
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85 至 91 列

8.4000	8.5000	8.6000	8.7000	8.8000	8.9000	9.0000
--------	--------	--------	--------	--------	--------	--------

92 至 98 列

9.1000	9.2000	9.3000	9.4000	9.5000	9.6000	9.7000
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99 至 101 列

9.8000	9.9000	10.0000
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A =

1 至 7 列

10.0000	10.0499	10.1980	10.4403	10.7703	11.1803	11.6619
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8 至 14 列

12.2066	12.8062	13.4536	14.1421	14.8661	15.6205	16.4012
---------	---------	---------	---------	---------	---------	---------

15 至 21 列

17.2047	18.0278	18.8680	19.7231	20.5913	21.4709	22.3607
---------	---------	---------	---------	---------	---------	---------

22 至 28 列

23.2594	24.1661	25.0799	26.0000	26.9258	27.8568	28.7924
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29 至 35 列

29.7321	30.6757	31.6228	32.5730	33.5261	34.4819	35.4401
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36 至 42 列

36.4005	37.3631	38.3275	39.2938	40.2616	41.2311	42.2019
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43 至 49 列

43.1741	44.1475	45.1221	46.0977	47.0744	48.0521	49.0306
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50 至 56 列

50.0100	50.9902	51.9711	52.9528	53.9351	54.9181	55.9017
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57 至 63 列

56.8859	57.8705	58.8558	59.8415	60.8276	61.8142	62.8013
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64 至 70 列

63.7887	64.7765	65.7647	66.7533	67.7422	68.7314	69.7209
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71 至 77 列

70.7107	71.7008	72.6911	73.6817	74.6726	75.6637	76.6551
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78 至 84 列

77.6466	78.6384	79.6304	80.6226	81.6149	82.6075	83.6002
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85 至 91 列

84.5931	85.5862	86.5794	87.5728	88.5664	89.5600	90.5539
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92 至 98 列

91.5478	92.5419	93.5361	94.5304	95.5249	96.5194	97.5141
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99 至 101 列

98.5089	99.5038	100.4988
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dd =

1.0e+03 \*

1 至 7 列

0.1690	0.1689	0.1686	0.1681	0.1674	0.1666	0.1655
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8 至 14 列

0.1643	0.1630	0.1616	0.1600	0.1584	0.1567	0.1550
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15 至 21 列

0.1532	0.1516	0.1500	0.1485	0.1471	0.1459	0.1450
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22 至 28 列

0.1443	0.1440	0.1441	0.1446	0.1456	0.1471	0.1492
29 至 35 列						
0.1521	0.1556	0.1600	0.1653	0.1715	0.1787	0.1870
36 至 42 列						
0.1966	0.2074	0.2195	0.2331	0.2482	0.2650	0.2835
43 至 49 列						
0.3038	0.3260	0.3502	0.3766	0.4051	0.4361	0.4694
50 至 56 列						
0.5054	0.5440	0.5854	0.6298	0.6771	0.7277	0.7816
57 至 63 列						
0.8388	0.8997	0.9642	1.0326	1.1050	1.1815	1.2622
64 至 70 列						
1.3474	1.4371	1.5316	1.6309	1.7352	1.8447	1.9596
71 至 77 列						
2.0800	2.2061	2.3380	2.4759	2.6201	2.7706	2.9276
78 至 84 列						
3.0914	3.2621	3.4399	3.6250	3.8176	4.0178	4.2259
85 至 91 列						
4.4421	4.6666	4.8995	5.1411	5.3916	5.6511	5.9200
92 至 98 列						
6.1984	6.4865	6.7846	7.0929	7.4116	7.7409	8.0810
99 至 101 列						
8.4323	8.7949	9.1690				

dd =

1 至 7 列						
13.0000	12.9962	12.9847	12.9657	12.9393	12.9059	12.8658
8 至 14 列						
12.8195	12.7675	12.7105	12.6491	12.5843	12.5169	12.4481
15 至 21 列						
12.3791	12.3111	12.2456	12.1841	12.1284	12.0802	12.0416

22 至 28 列

12.0145	12.0011	12.0035	12.0240	12.0649	12.1284	12.2166
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29 至 35 列

12.3315	12.4751	12.6491	12.8550	13.0942	13.3676	13.6760
---------	---------	---------	---------	---------	---------	---------

36 至 42 列

14.0201	14.4001	14.8161	15.2681	15.7558	16.2788	16.8367
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43 至 49 列

17.4290	18.0549	18.7139	19.4052	20.1282	20.8822	21.6666
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50 至 56 列

22.4807	23.3238	24.1955	25.0951	26.0221	26.9760	27.9564
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57 至 63 列

28.9629	29.9950	31.0524	32.1347	33.2415	34.3727	35.5279
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64 至 70 列

36.7069	37.9094	39.1352	40.3841	41.6559	42.9504	44.2675
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71 至 77 列

45.6070	46.9688	48.3527	49.7587	51.1865	52.6361	54.1075
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78 至 84 列

55.6004	57.1148	58.6507	60.2080	61.7865	63.3863	65.0072
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85 至 91 列

66.6492	68.3122	69.9963	71.7013	73.4272	75.1740	76.9415
---------	---------	---------	---------	---------	---------	---------

92 至 98 列

78.7299	80.5390	82.3688	84.2193	86.0904	87.9822	89.8945
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99 至 101 列

91.8275	93.7809	95.7549
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A =

1 至 7 列

0.7692	0.7733	0.7854	0.8052	0.8324	0.8663	0.9064
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8 至 14 列

0.9522	1.0030	1.0585	1.1180	1.1813	1.2479	1.3176
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15 至 21 列

1.3898	1.4644	1.5408	1.6188	1.6978	1.7774	1.8570
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22 至 28 列

1.9359	2.0137	2.0894	2.1623	2.2317	2.2968	2.3568
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29 至 35 列

2.4111	2.4590	2.5000	2.5339	2.5604	2.5795	2.5914
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36 至 42 列

2.5963	2.5946	2.5869	2.5736	2.5554	2.5328	2.5065
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43 至 49 列

2.4771	2.4452	2.4112	2.3755	2.3387	2.3011	2.2630
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50 至 56 列

2.2246	2.1862	2.1480	2.1101	2.0727	2.0358	1.9996
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57 至 63 列

1.9641	1.9293	1.8954	1.8622	1.8299	1.7984	1.7677
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64 至 70 列

1.7378	1.7087	1.6805	1.6530	1.6262	1.6002	1.5750
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71 至 77 列

1.5504	1.5266	1.5034	1.4808	1.4588	1.4375	1.4167
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78 至 84 列

1.3965	1.3768	1.3577	1.3391	1.3209	1.3032	1.2860
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85 至 91 列

1.2692	1.2529	1.2369	1.2214	1.2062	1.1914	1.1769
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92 至 98 列

1.1628	1.1490	1.1356	1.1224	1.1096	1.0970	1.0848
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99 至 101 列

1.0728	1.0610	1.0495
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re =

1 至 7 列

130.0000	133.9000	137.6000	141.1000	144.4000	147.5000	150.4000
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8 至 14 列

153.1000	155.6000	157.9000	160.0000	161.9000	163.6000	165.1000
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15 至 21 列

166.4000 167.5000 168.4000 169.1000 169.6000 169.9000 170.0000

22 至 28 列

169.9000 169.6000 169.1000 168.4000 167.5000 166.4000 165.1000

29 至 35 列

163.6000 161.9000 160.0000 157.9000 155.6000 153.1000 150.4000

36 至 42 列

147.5000 144.4000 141.1000 137.6000 133.9000 130.0000 125.9000

43 至 49 列

121.6000 117.1000 112.4000 107.5000 102.4000 97.1000 91.6000

50 至 56 列

85.9000 80.0000 73.9000 67.6000 61.1000 54.4000 47.5000

57 至 63 列

40.4000 33.1000 25.6000 17.9000 10.0000 1.9000 -6.4000

64 至 70 列

-14.9000 -23.6000 -32.5000 -41.6000 -50.9000 -60.4000 -70.1000

71 至 77 列

-80.0000 -90.1000 -100.4000 -110.9000 -121.6000 -132.5000 -143.6000

78 至 84 列

-154.9000 -166.4000 -178.1000 -190.0000 -202.1000 -214.4000 -226.9000

85 至 91 列

-239.6000 -252.5000 -265.6000 -278.9000 -292.4000 -306.1000 -320.0000

92 至 98 列

-334.1000 -348.4000 -362.9000 -377.6000 -392.5000 -407.6000 -422.9000

99 至 101 列

-438.4000 -454.1000 -470.0000

re =

1 至 7 列

10.0000 10.3030 10.5971 10.8826 11.1598 11.4289 11.6899

8 至 14 列

11.9427	12.1872	12.4228	12.6491	12.8653	13.0703	13.2630
---------	---------	---------	---------	---------	---------	---------

15 至 21 列

13.4420	13.6056	13.7519	13.8788	13.9837	14.0643	14.1177
---------	---------	---------	---------	---------	---------	---------

22 至 28 列

14.1413	14.1321	14.0876	14.0053	13.8832	13.7199	13.5145
---------	---------	---------	---------	---------	---------	---------

29 至 35 列

13.2668	12.9779	12.6491	12.2831	11.8831	11.4531	10.9973
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36 至 42 列

10.5206	10.0277	9.5234	9.0123	8.4985	7.9858	7.4777
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43 至 49 列

6.9769	6.4858	6.0062	5.5397	5.0874	4.6499	4.2277
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50 至 56 列

3.8211	3.4300	3.0543	2.6938	2.3480	2.0166	1.6991
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57 至 63 列

1.3949	1.1035	0.8244	0.5570	0.3008	0.0553	-0.1801
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64 至 70 列

-0.4059	-0.6225	-0.8305	-1.0301	-1.2219	-1.4063	-1.5836
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71 至 77 列

-1.7541	-1.9183	-2.0764	-2.2288	-2.3756	-2.5173	-2.6540
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78 至 84 列

-2.7860	-2.9134	-3.0366	-3.1557	-3.2709	-3.3824	-3.4904
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85 至 91 列

-3.5949	-3.6963	-3.7945	-3.8897	-3.9822	-4.0719	-4.1590
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92 至 98 列

-4.2436	-4.3259	-4.4058	-4.4835	-4.5592	-4.6328	-4.7044
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99 至 101 列

-4.7742	-4.8421	-4.9084
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im =

1 至 7 列

130.0000	125.0000	120.0000	115.0000	110.0000	105.0000	100.0000
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8 至 14 列

95.0000 90.0000 85.0000 80.0000 75.0000 70.0000 65.0000

15 至 21 列

60.0000 55.0000 50.0000 45.0000 40.0000 35.0000 30.0000

22 至 28 列

25.0000 20.0000 15.0000 10.0000 5.0000 0 -5.0000

29 至 35 列

-10.0000 -15.0000 -20.0000 -25.0000 -30.0000 -35.0000 -40.0000

36 至 42 列

-45.0000 -50.0000 -55.0000 -60.0000 -65.0000 -70.0000 -75.0000

43 至 49 列

-80.0000 -85.0000 -90.0000 -95.0000 -100.0000 -105.0000 -110.0000

50 至 56 列

-115.0000 -120.0000 -125.0000 -130.0000 -135.0000 -140.0000 -145.0000

57 至 63 列

-150.0000 -155.0000 -160.0000 -165.0000 -170.0000 -175.0000 -180.0000

64 至 70 列

-185.0000 -190.0000 -195.0000 -200.0000 -205.0000 -210.0000 -215.0000

71 至 77 列

-220.0000 -225.0000 -230.0000 -235.0000 -240.0000 -245.0000 -250.0000

78 至 84 列

-255.0000 -260.0000 -265.0000 -270.0000 -275.0000 -280.0000 -285.0000

85 至 91 列

-290.0000 -295.0000 -300.0000 -305.0000 -310.0000 -315.0000 -320.0000

92 至 98 列

-325.0000 -330.0000 -335.0000 -340.0000 -345.0000 -350.0000 -355.0000

99 至 101 列

-360.0000 -365.0000 -370.0000

im =

1 至 7 列

10.0000	9.6182	9.2417	8.8696	8.5012	8.1358	7.7725
8 至 14 列						
7.4106	7.0491	6.6874	6.3246	5.9598	5.5924	5.2217
15 至 21 列						
4.8469	4.4675	4.0831	3.6933	3.2980	2.8973	2.4914
22 至 28 列						
2.0808	1.6665	1.2496	0.8317	0.4144	0	-0.4093
29 至 35 列						
-0.8109	-1.2024	-1.5811	-1.9448	-2.2911	-2.6183	-2.9248
36 至 42 列						
-3.2097	-3.4722	-3.7122	-3.9298	-4.1255	-4.3001	-4.4545
43 至 49 列						
-4.5901	-4.7079	-4.8093	-4.8956	-4.9681	-5.0282	-5.0769
50 至 56 列						
-5.1155	-5.1450	-5.1663	-5.1803	-5.1879	-5.1898	-5.1866
57 至 63 列						
-5.1790	-5.1675	-5.1526	-5.1346	-5.1141	-5.0912	-5.0664
64 至 70 列						
-5.0399	-5.0120	-4.9827	-4.9524	-4.9213	-4.8894	-4.8568
71 至 77 列						
-4.8238	-4.7904	-4.7567	-4.7228	-4.6887	-4.6546	-4.6204
78 至 84 列						
-4.5863	-4.5522	-4.5183	-4.4845	-4.4508	-4.4174	-4.3841
85 至 91 列						
-4.3511	-4.3184	-4.2859	-4.2538	-4.2219	-4.1903	-4.1590
92 至 98 列						
-4.1280	-4.0974	-4.0671	-4.0371	-4.0074	-3.9781	-3.9491
99 至 101 列						
-3.9204	-3.8920	-3.8640				

1 至 7 列

0.5141	0.6138	0.7115	0.8056	0.8946	0.9777	1.0545
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8 至 14 列

1.1248	1.1888	1.2469	1.2995	1.3471	1.3902	1.4292
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15 至 21 列

1.4646	1.4969	1.5263	1.5532	1.5778	1.6004	1.6212
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22 至 28 列

1.6405	1.6583	1.6748	1.6901	1.7044	1.7177	1.7302
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29 至 35 列

1.7419	1.7528	1.7631	1.7728	1.7820	1.7907	1.7988
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36 至 42 列

1.8066	1.8139	1.8209	1.8276	1.8339	1.8399	1.8457
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43 至 49 列

1.8511	1.8564	1.8614	1.8662	1.8708	1.8752	1.8795
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50 至 56 列

1.8836	1.8875	1.8913	1.8949	1.8984	1.9018	1.9050
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57 至 63 列

1.9082	1.9112	1.9142	1.9170	1.9197	1.9224	1.9250
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64 至 70 列

1.9275	1.9299	1.9322	1.9345	1.9367	1.9389	1.9410
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71 至 77 列

1.9430	1.9450	1.9469	1.9488	1.9506	1.9523	1.9541
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78 至 84 列

1.9557	1.9574	1.9590	1.9605	1.9621	1.9635	1.9650
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85 至 91 列

1.9664	1.9678	1.9691	1.9704	1.9717	1.9730	1.9742
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92 至 98 列

1.9754	1.9766	1.9778	1.9789	1.9800	1.9811	1.9822
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99 至 101 列

1.9832	1.9842	1.9852
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sys =

$$\frac{10 s + 10}{s^2 + 4 s + 13}$$

Continuous-time transfer function.



