2(d) Movement of Poles.

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Description: Movement of poles is shown along the real and img axis

```
clc;
poles = [-10+20i -10-20i -5+10i -5-10i -10+10i -10-10i  3+10i 3-10i
 -5+0i +5+0i -10+0i +10-0i ];
zeros = [0 0];
gain = 0.9;
s=zpk(zeros,poles,gain);
pzplot(s)
[wn,zeta] = damp(s)
```

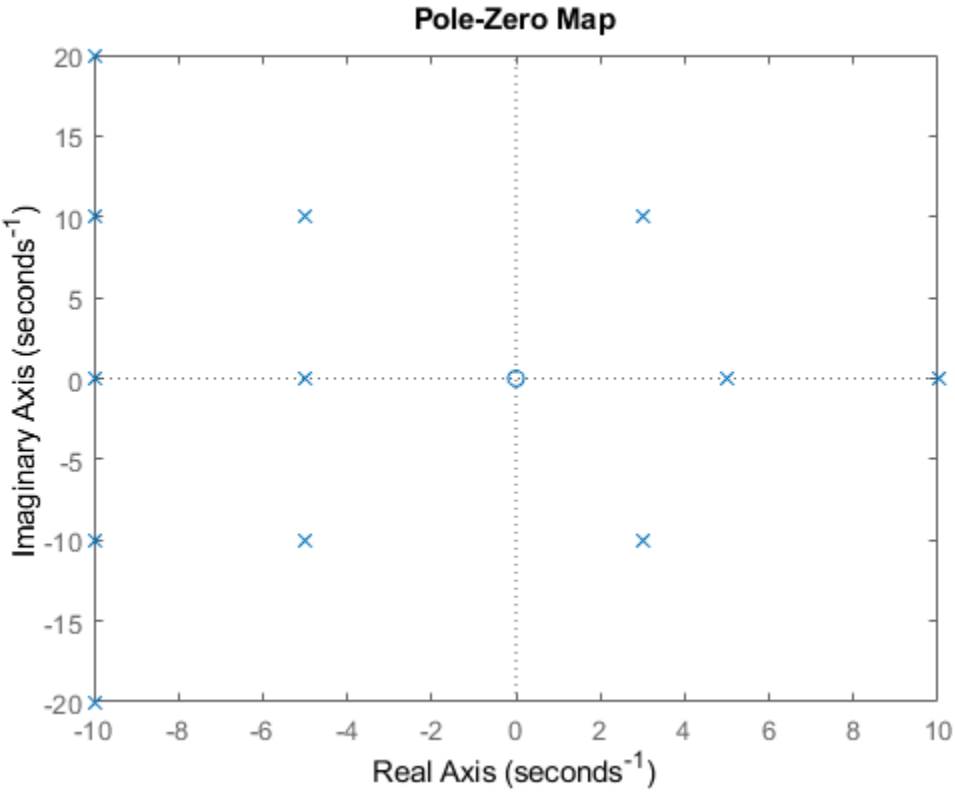
```
wn =

    5.0000
    5.0000
   10.0000
   10.0000
   10.4403
   10.4403
   11.1803
   11.1803
   14.1421
   14.1421
   22.3607
   22.3607


zeta =

    1.0000
   -1.0000
    1.0000
   -1.0000
   -0.2873
   -0.2873
    0.4472
    0.4472
    0.7071
```

```
0.7071
0.4472
0.4472
```



Analysis

If we move along the roots along the wn, the frequency of the system increases. Overshoot remains same. If we move along the jw axis, overshoot of system increases. frequency of system increases. If we move along zeta wn axis or sigma, Overshoot increases, frequency decreases on right side movement. Overshoot decreases, frequency increases on left side movement.

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