Title:Control System-Second Order System: Horizontal shifting

```
%Author:ShivaKumar Naga Vankadhara
%PS No:99003727
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%Version:1.4
```
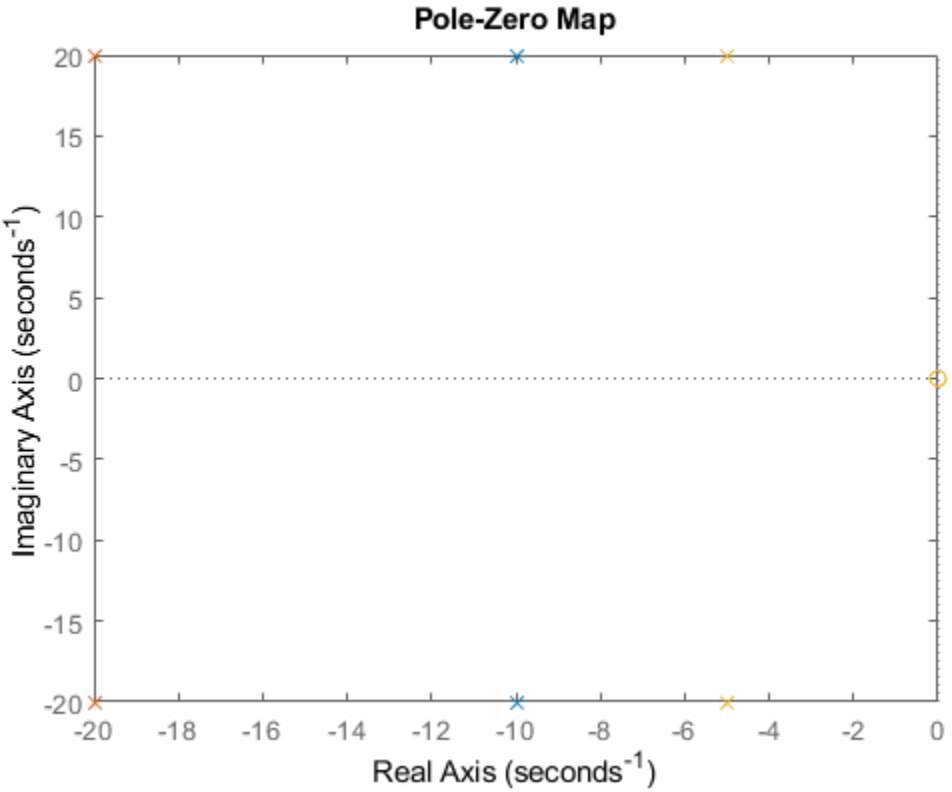

First set of poles

```
zeros = 0;
poles = [-10+20i -10-20i];
gain = 1;
sys1 = zpk(zeros,poles,gain);
hold on
pzmap(sys1)
[wn,zeta]=damp(sys1)

% Second set of poles
zeros = 0;
poles = [-20+20i -20-20i];
gain = 1;
sys2 = zpk(zeros,poles,gain);
hold on
pzmap(sys2)
[wn,zeta]=damp(sys2)

% Third set of poles
zeros = 0;
poles = [-5+20i -5-20i];
gain = 1;
sys3 = zpk(zeros,poles,gain);
pzmap(sys3)
[wn,zeta]=damp(sys3)
```

```
wn =

   22.3607
   22.3607


zeta =

    0.4472
    0.4472


wn =

   28.2843
   28.2843
```

```
zeta =

    0.7071
    0.7071


wn =

   20.6155
   20.6155


zeta =

    0.2425
    0.2425
```



Analysis: Horizontal movement of pole analysis:

1.The Pole pair which is nearer to the imaginary axis have lesser damping ratio which says that it must not more stable. 2.The pole pair which is far away to the imaginary axis have higher damping ratio which

shows the system stability. 3.When the pole pair is far away from the imaginary axis(i.e.leftside) the system has higher frequency when compared to the other two set of poles which is nearer to the imaginary axis 4.As all the set of poles have zeta values lying in the range of [0-1] so they have a complex conjugate roots. 5.The overshoot,damping of all the pole pairs are inversly proportional to each other in the given range of poles. 6.If overshoot is high rise time is less that means the system is fast.

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