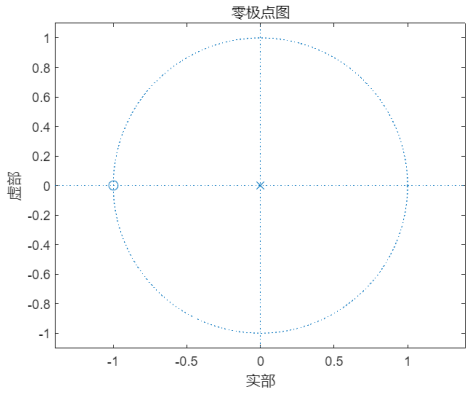
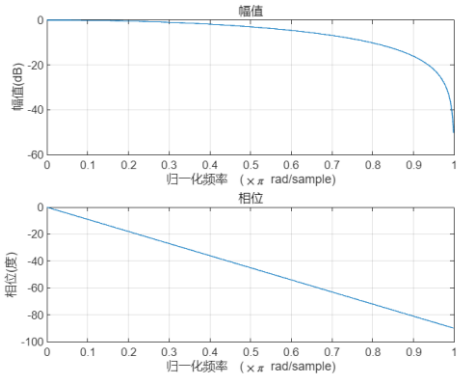
滑动平均系统:

源代码如下:

```
h2 = [1 1]/2;
h3 = [1 1 1]/3;
h4 = [1 1 1 1]/4;
h5 = [1 1 1 1 1]/5;
zplane(h2,1)
freqz(h2,1)
zplane(h3,1)
freqz(h3,1)
zplane(h4,1)
freqz(h4,1)
zplane(h5,1)
freqz(h5,1)
```

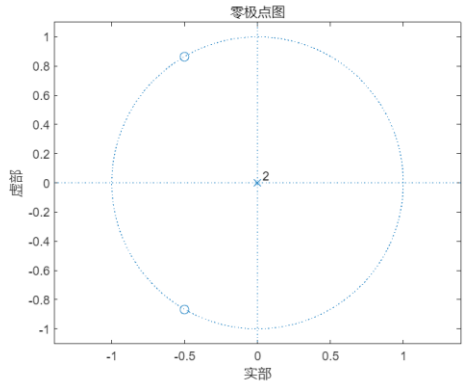
当 M=2 时:

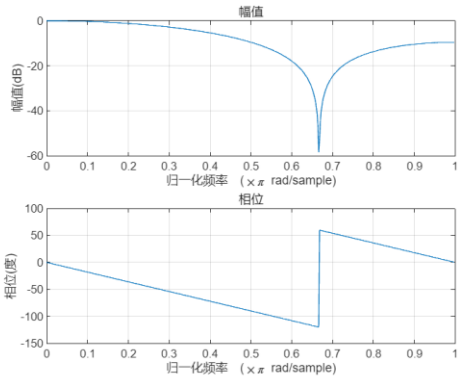




此时存在 1 对零极点， II 类

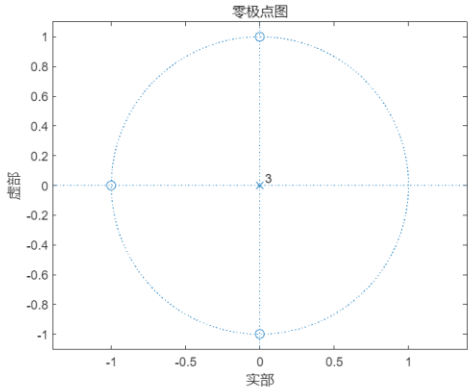
当 M=3 时:

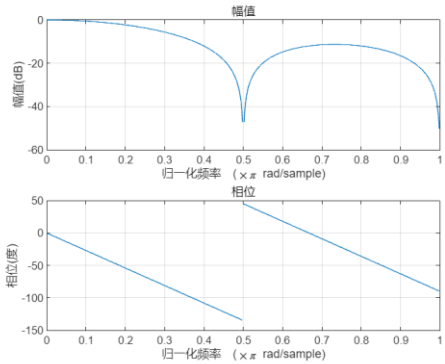




此时存在 2 对零极点， I 类

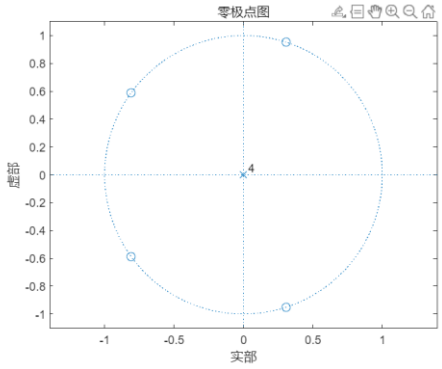
当 M=4 时：

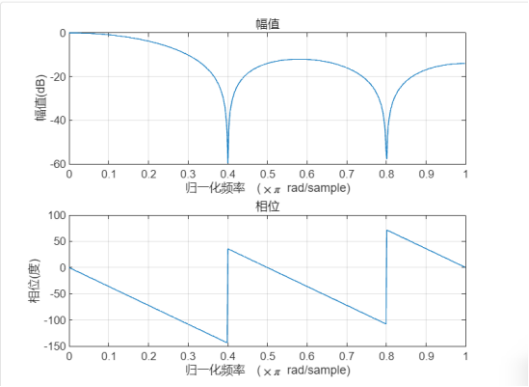




此时有 3 对零极点， II 类

当 M=5 时：





此时有 4 对零极点， I 类

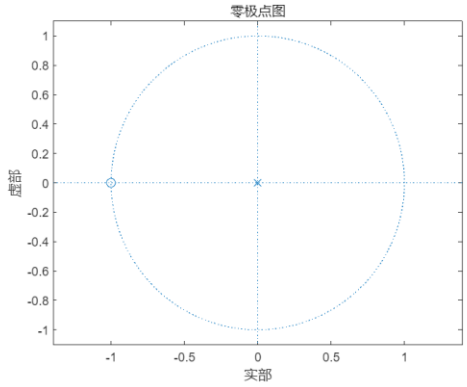
可以看出：**当 M 增大时，截止频率变低**

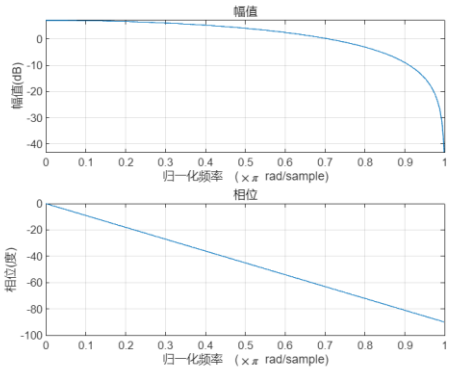
滑动平均的延时互补系统：

源代码如下：

```
h2 = sinc([0 1]-0.5)--[1 1]/2;
zplane(h2,1)
freqz(h2,1)
h3 = [0 1 0]-[1 1 1]/3;
zplane(h3,1)
freqz(h3,1)
h4 = sinc([0 1 2 3]-1.5)-[1 1 1 1]/4;
zplane(h4,1)
freqz(h4,1)
h5 = [0 0 1 0 0]-[1 1 1 1 1]/5;
zplane(h5,1)
freqz(h5,1)
```

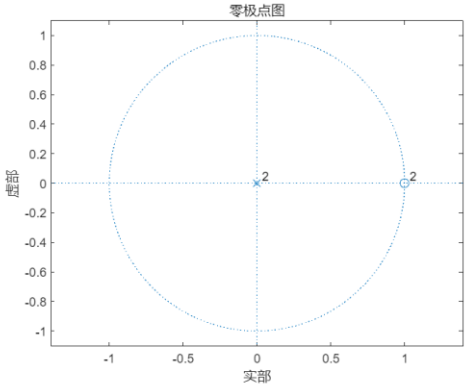
当 M=2 时：

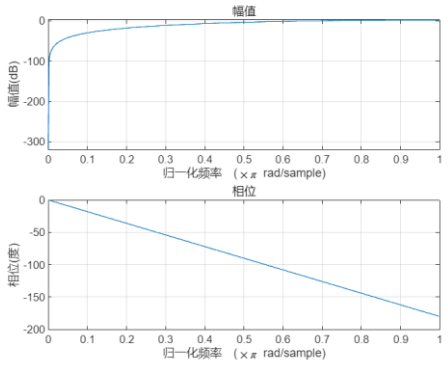




有 1 对零极点， II 类

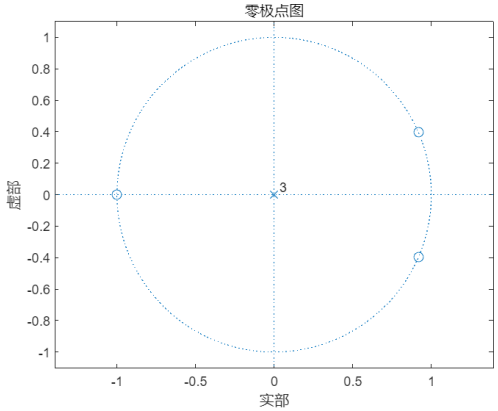
当 M=3 时：

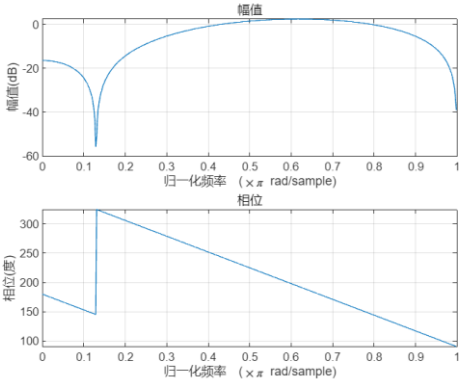




有 2 对零极点， I 类，高通滤波器

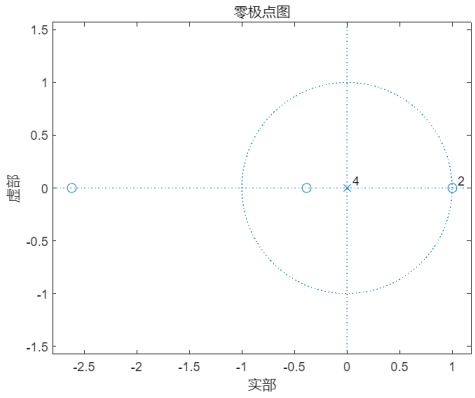
当 M=4 时：

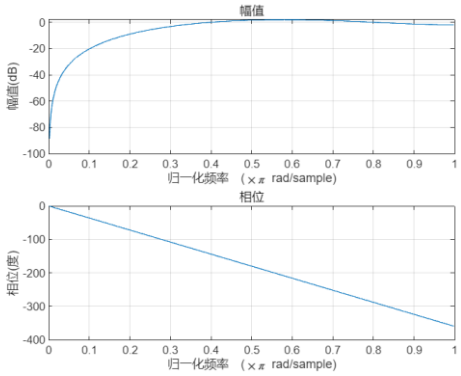




有 3 对零极点， II 类

当 M=5 时：





有 4 对零极点，Ⅰ类，高通滤波器