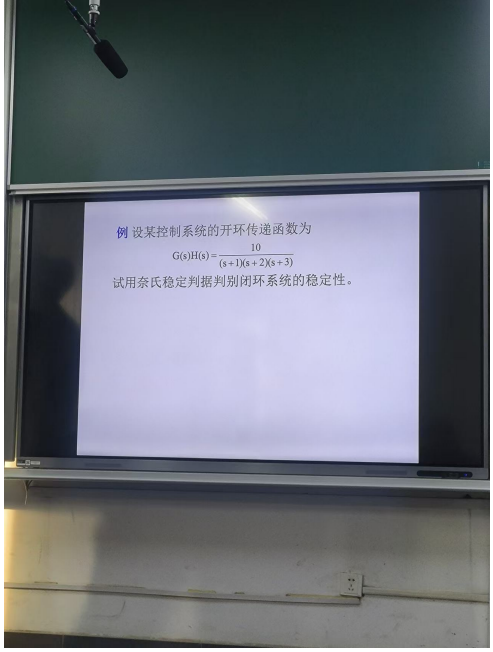


1. $G(jw)=\frac{10}{(jw+1)(jw+2)(jw+3)}$ $G(j0+)=1.67\angle 0°$ $G(j\infty)=0\angle -270°$

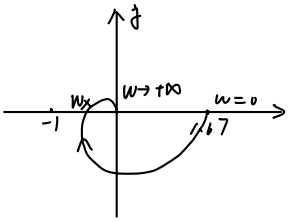
$=-\frac{60(w^2-1)}{(w^2+1)(w^2+4)(w^2+9)}-j\frac{10w(11-w^2)}{(w^2+1)(w^2+4)(w^2+9)}$

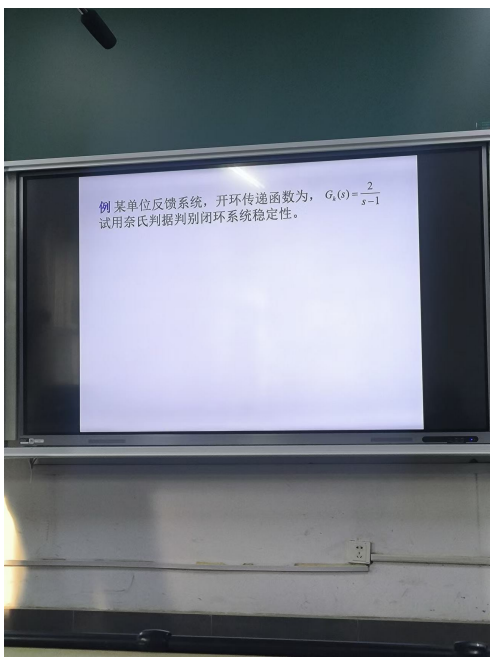
$w_x=\sqrt{11}$

$Re[G(jw_x)]=-0.17$

$P=0,\ n=0$

$\therefore Z=0$. 稳定



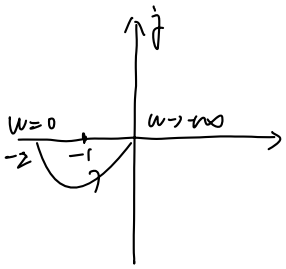


2. $G(jw)=\frac{2}{jw-1}=-\frac{2}{w^2+1}-j\frac{2w}{w^2+1}=\frac{2}{\sqrt{w^2+1}}e^{\arctan w}$

$G(j0+)=-2\angle 0°$ $G(j\infty)=0\angle -90°$

$w\to+\infty$

$\arctan w\to+90°$???

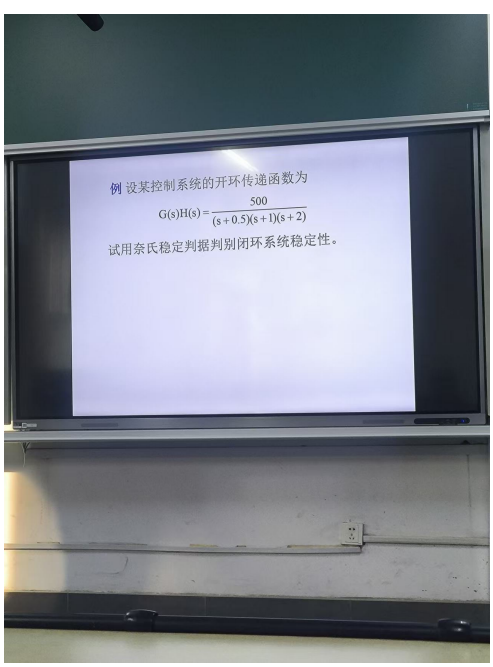


$P=1$

$n=0.5$

$Z=P-2n=0$

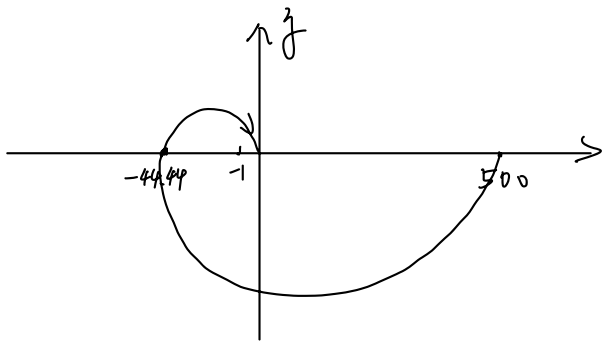
∴ 稳定



3. $G(jw)=\frac{500}{(jw+0.5)(jw+1)(jw+2)}=-\frac{500[3.5w^2-1+j(3.5w-w^3)]}{(w^2+0.25)(w^2+1)(w^2+4)}$

$G(j0+)=500\angle 0°$ $G(j\infty)=0\angle -270°$

$w_x=1.87\ rad/s$ $Re[G(jw_x)]=-44.44$

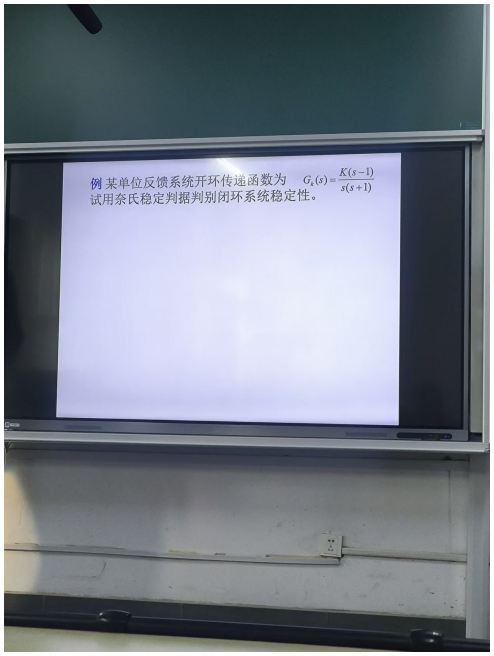


$P=0$

$n=-1$

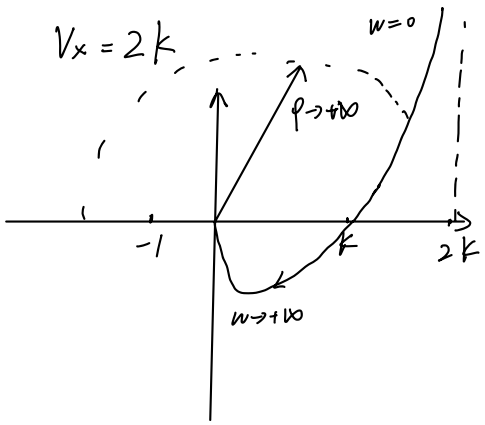
$Z=2$

∴ 不稳定



4. $G(jw)=\frac{k(jw-1)}{jw(jw+1)}=\frac{2w^2+jw(1-w^2)}{w^2(w^2+1)}\cdot k$

$G(j0)=\infty\angle -90°$ $G(j\infty)=0\angle -90°$



$w_x=1$

$Re[G(jw)]=k$

$P=0$

$n=-0.5$

$Z=1$

∴不稳定