小组讨论.

1. A

2. C

3. C

填空.

1. $X(z) = \frac{z}{3-z} + \frac{1}{1-\frac{2}{z}}$, ROC: $2<|z|<3$

2. ~~6000Hz~~ 3000Hz

计算

1. $y(n) = x_1(n+3) * x_2(-n+1)$, $x_1(n) = (\frac{1}{2})^n u(n)$, $x_2(n) = (\frac{1}{3})^n u(n)$

$Y(z) = \cancel{X_1(z)\, Z[X]}\ Z[x_1(n+3)] \cdot Z[x_2(-n+1)]$

$Z[x_1(n+3)] = \sum_{n=-\infty}^{+\infty} x_1(n+3) z^{-n} = \sum_{n=-\infty}^{+\infty} x_1(n+3) z^{-(n+3)} \cdot z^3 = z^3 X_1(z)$.

$Z[x_2(-n+1)] = \sum_{n=-\infty}^{+\infty} x_2(-n+1) z^{-n} = z^{-1}\sum_{n=-\infty}^{+\infty} x_2(-n+1) z^{-n+1} = z^{-1}\sum_{n=-\infty}^{+\infty} x_2(n) z^{n} = z^{-1} X_2(z^{-1})$

$X_1(z) = \frac{1}{1-\frac{1}{2}z^{-1}}$, $X_2(z) = \frac{1}{1-\frac{1}{3}z^{-1}}$

2. $Y(z) = z^2 \frac{1}{1-\frac{1}{2}z^{-1}} \cdot \frac{1}{1-\frac{1}{3}z}$, ROC: $\frac{1}{2}<|z|<3$

$Y(z) = 3z \cdot \left(\frac{1}{5}\frac{1}{1-\frac{1}{2}z^{-1}} - \frac{6}{5}\frac{1}{1-3z^{-1}}\right)$, $3\left(\frac{1}{5}\frac{1}{1-\frac{1}{2}z^{-1}} - \frac{6}{5}\frac{1}{1-3z^{-1}}\right) = W(z)$

$\therefore$ ~~$y(n) =$~~ ~~$W(z)$~~ $w(n) = \frac{1}{5}(\frac{1}{2})^n u(n) + \frac{6}{5}(3)^n u(-n-1)$

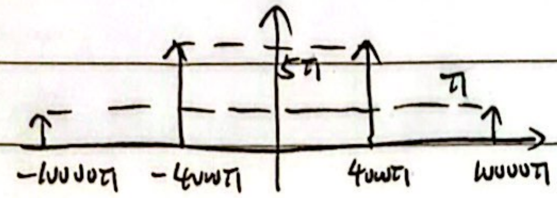
~~$Y(z) =$~~ $Y(n) = 3w(n+1) = \frac{3}{5}(\frac{1}{2})^{n+1} u(n+1) + \frac{18}{5}(3)^{n+1} u(-n-2)$.

CS 扫描全能王
3亿人都在用的扫描App

2、$x_a(t)=5\cos(2\pi\cdot 2000t)+\cos(2\pi\cdot 5000t)$ $T=\frac{1}{8000}$

$X_a(\omega)=5\pi[\delta(\omega-4000\pi)+\delta(\omega+4000\pi)]+\pi[\delta(\omega-10000\pi)+\delta(\omega+10000\pi)]$

频谱为

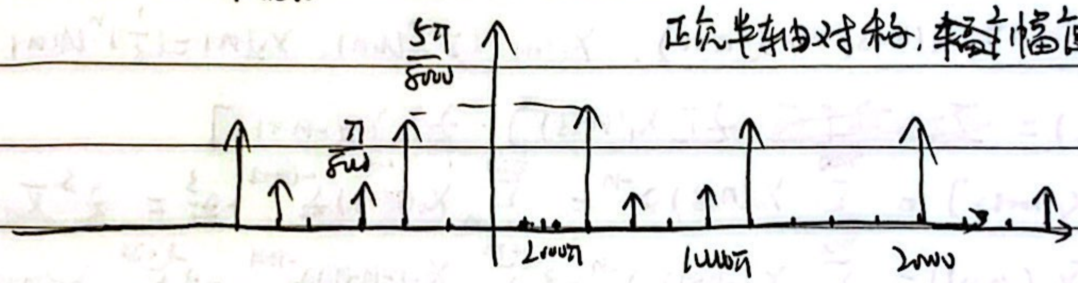


设 $p(t)=\sum\delta(t-nT)$，$\hat{X}(\omega)=\frac{1}{2\pi}[X_a(\omega)*P(\omega)]$.

$P(\omega)=\frac{2\pi}{T}\sum\delta(\omega-\omega_s n)$ $\omega_s=\frac{2\pi}{T}$

∴ $\hat{X}(\omega)=\frac{1}{T}\sum_{n=-\infty}^{+\infty}X_a(\omega-\omega_s n)$ $\omega_s=16000\pi$

正负半轴对称，幅度为 $\frac{1}{T}$



$16000\pi-10000\pi=6000\pi$ 到 10000π 发生混叠，以上全是角频率

3、$y(n)-0.16y(n-2)=0.25x(n-2)+x(n)$.

(1) 两边 $Z[\ ]$，得到 $Y(z)-0.16z^{-2}Y(z)=0.25z^{-2}X(z)+X(z)$

⇒ $Y(z)=\frac{1+0.25z^{-2}}{1-0.16z^{-2}}X(z)$ ⇒ $H(z)=\frac{1+0.25z^{-2}}{1-0.16z^{-2}}$

由于因果，ROC: $|z|>$ ~~…~~ 0.4，包含 $|z|=1$ ∴ 稳定.

(2)