1. $x_1(n) = \sin(0.08\pi n)$ $\quad$ $x_2(n) = e^{j1.3\pi n}$

周期：$N = \frac{2\pi}{0.08\pi} = 25$ $\quad$ $N = \frac{2\pi}{1.3\pi} \cdot 13 = 20$

$x_3(n) = A\cos(1.5\pi n + 0.7\pi) + B\cos(0.6\pi n) - C\sin(0.5\pi n)$

当 $N=20$ 时

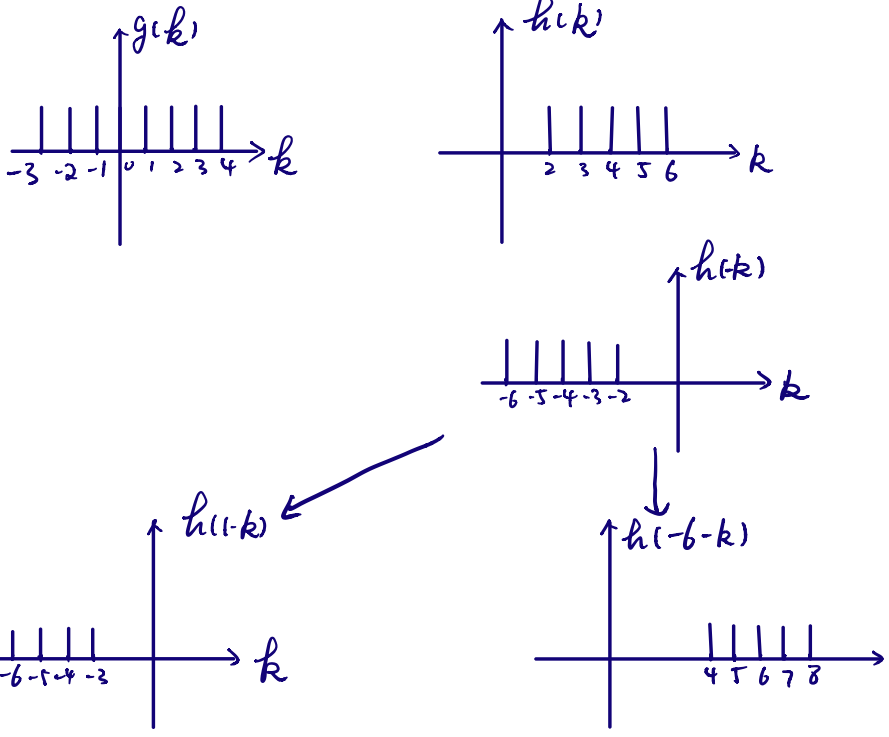
$x_3(n+N) = A\cos(1.5\pi n + 0.7\pi + 30\pi) + B\cos(0.6\pi n + 18\pi)$

$\quad - C\sin(0.5\pi n + 10\pi)$

$= x_3(n)$

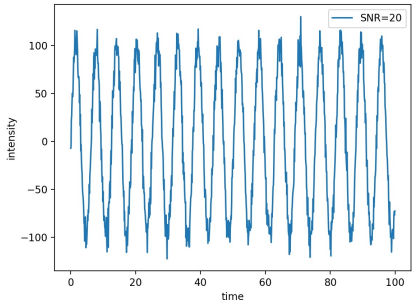
$\therefore N = 20$

2. $y(n) = g(n) \otimes h(n) = \sum_{k=-\infty}^{\infty} g(k)h(n-k)$

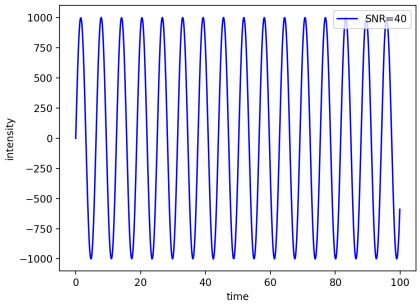


则 $y(n)$ 的定义范围为 $[-6, 1]$，长度为 7

3. (1) 以下两图分别为 SNR=20 以及 SNR=40 时的两个正弦信号



低信噪比（SNR=20dB）信号



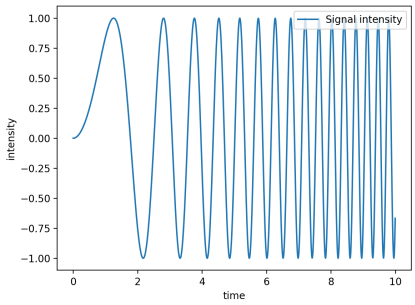
高信噪比（SNR=40dB）信号

(2) 所生成的信号为解析信号，表达式为：

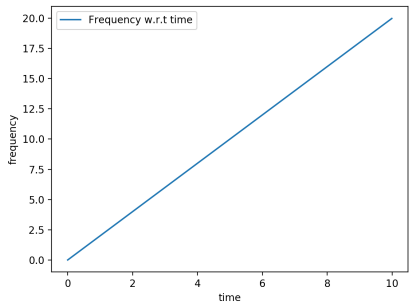
$$y = \sin(\alpha t^2)$$

其瞬时频率为

$$f(t) = \varphi'(t) = 2\alpha t$$



频率随时间变化的信号



瞬时频率变化曲线

代码见附件