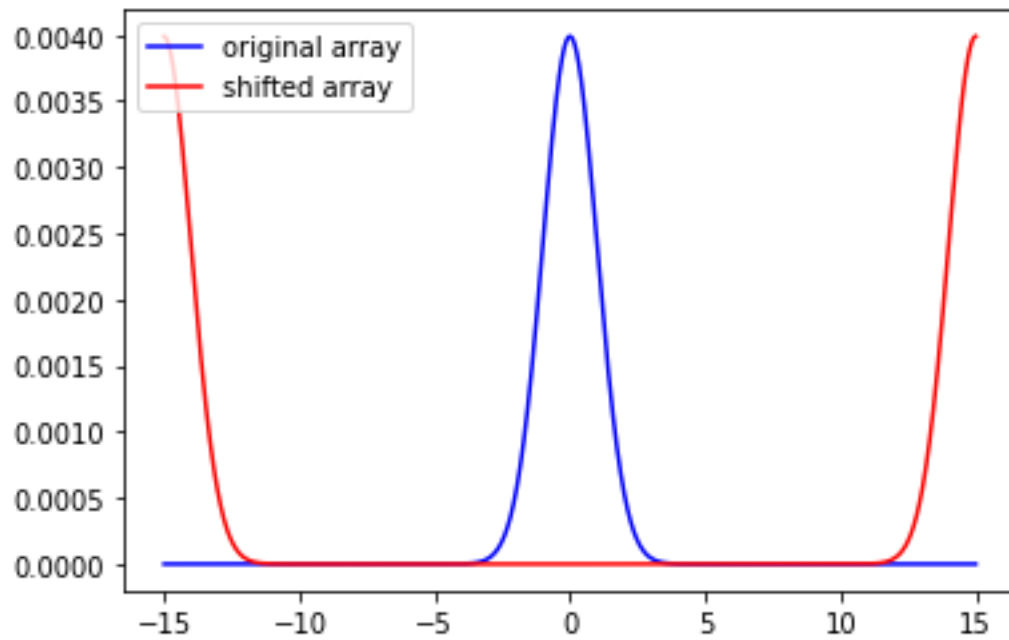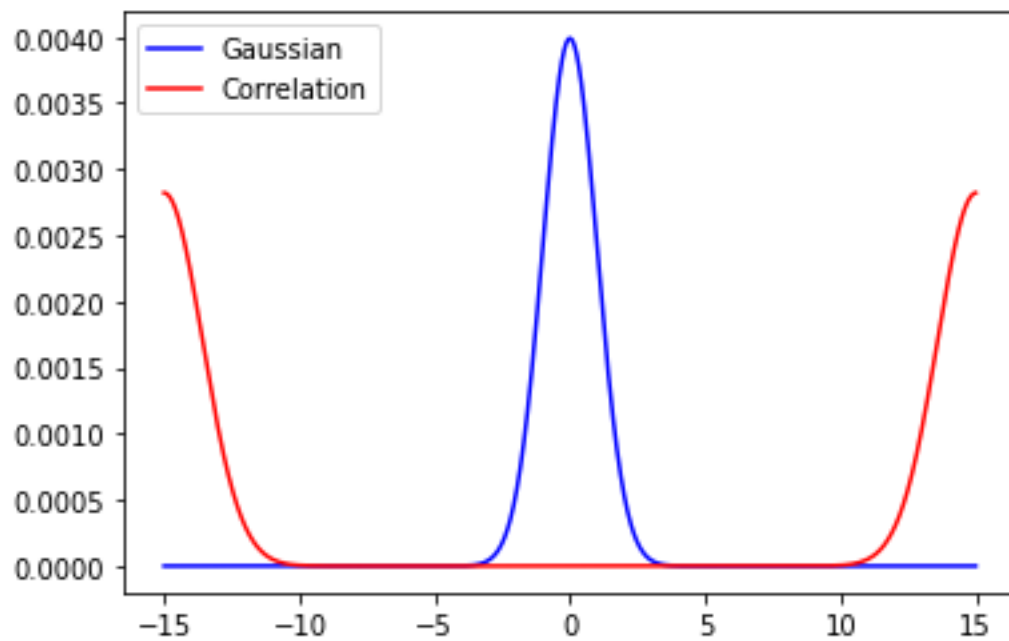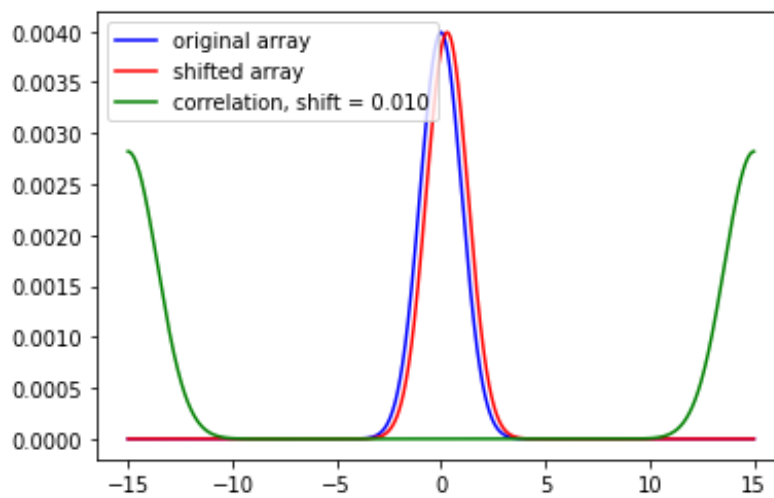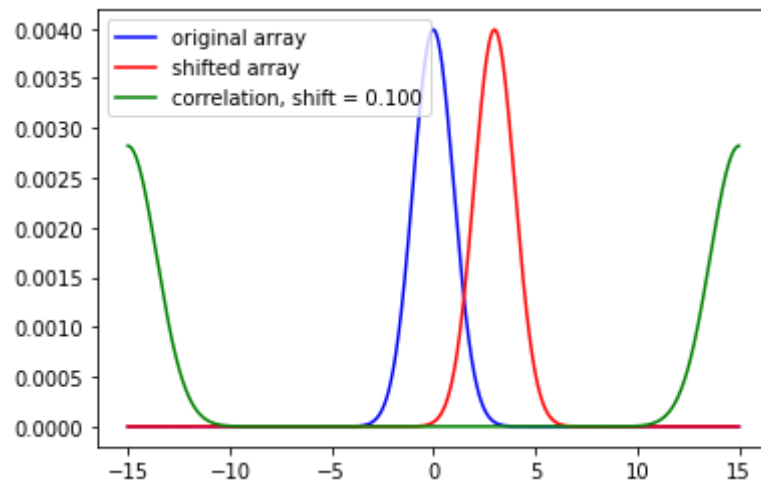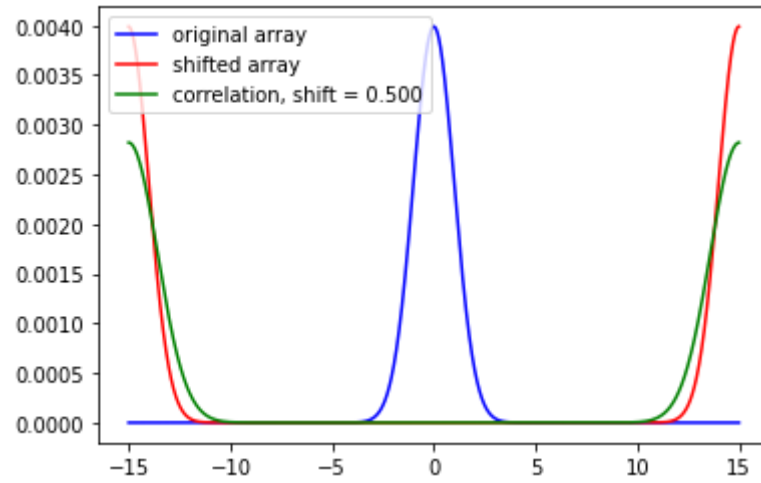# PHYS-512 PS5

Chuyang Li 260744689
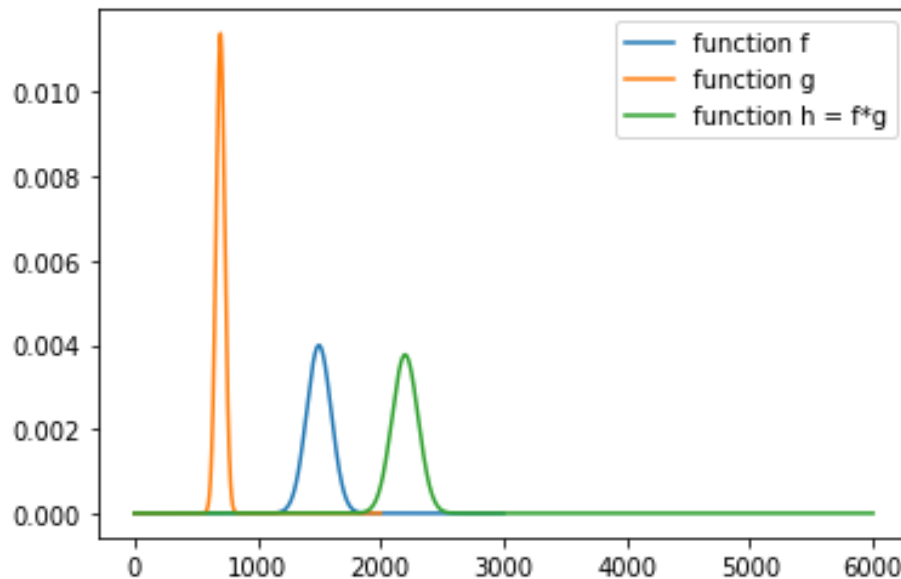
Q1.

Q2.

Q3.

As shown in the graphs above, the correlation function (green) does not depend on the shift (red). Autocorrelation does not depend on the shift.
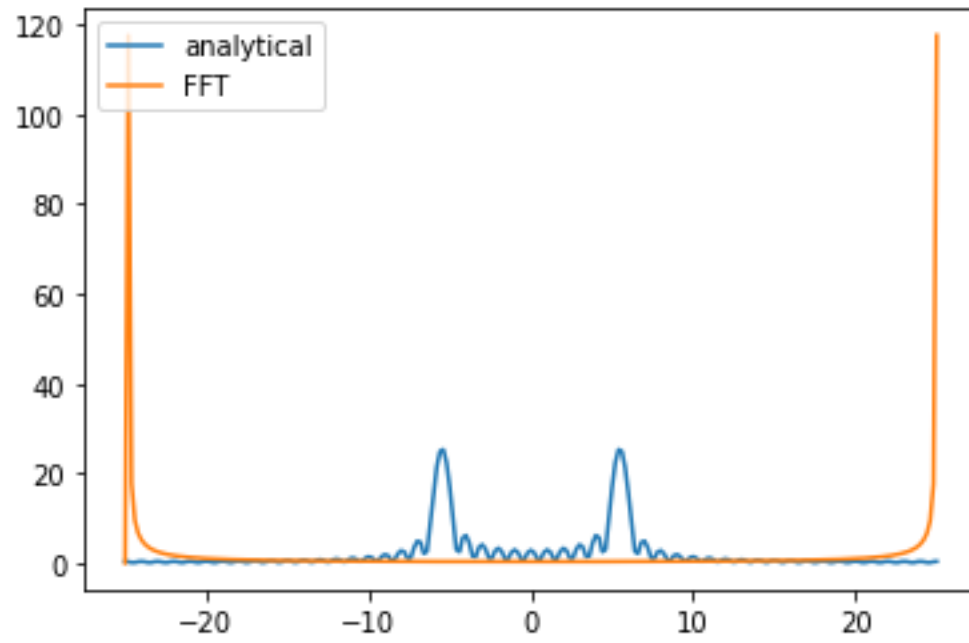

Q4.

The output array is 2 times as long as the longest array between f and g.

Q5.

a)

$$\sum_{x=0}^{N-1} exp\left(-2\pi ikx/N\right)$$

$$= \sum_{x=0}^{N-1} 1\cdot\left[exp\left(-2\pi ik/N\right)\right]^{x}$$

$$= 1 \cdot \frac{1 - \left[exp(-2\pi ik/N)\right]^{N}}{1 - exp(-2\pi ik/N)}$$

$$= \frac{1 - exp(-2\pi ik)}{1 - exp(-2\pi ik/N)}$$

c)

Std is 11.246715049499588.