Consider the two plots below:

The two signals differ only in a time shift – i.e., they differ only in phase.

The Fourier coefficients for Figure (i) (for \( c_k \neq 0 \)) are:

\[
c_k = \frac{1}{\pi k} \sin(\pi k a / T)
\]

The Fourier coefficients for Figure (ii) (for \( c_k \neq 0 \)) are:

\[
c_k = \frac{j}{2\pi k} \left( e^{-j2\pi k a / T} - 1 \right)
\]

We can do some algebra on this:

\[
c_k = \frac{j}{2\pi k} \left( e^{-j2\pi k a / T} - 1 \right) = \frac{j}{2\pi k} e^{-j\pi k a / T} \left( e^{-j\pi k a / T} - e^{j\pi k a / T} \right) = \frac{1}{2\pi k} e^{-j\pi k a / T} \left( e^{j\pi k a / T} - e^{-j\pi k a / T} \right) = \frac{1}{\pi k} e^{-j\pi k a / T} \sin(\pi k a / T)
\]

Thus the two series are the same except for a phase difference of

\[ e^{-j\pi k a / T} \]