$$\begin{array}{c}
C(\omega) \\
\hat{\mathcal{F}}[f_0] \\
\longrightarrow \\
0
\end{array}$$

$$\begin{array}{c}
\hat{\mathcal{F}}[f_0 e^{i\omega_0 t}] \\
\longrightarrow \\
\omega_0
\end{array}$$