$$\begin{array}{c} {\color{red}L_1} \\ {\color{red}L_2} \\ {\color{red}L_3} \\ {\color{red}L_4} \\ {\color{red}L_5} \\ {\color{red}L_6} \\ {\color{red}L_7} \\ {\color{red}L_8} \\ {\color{red}L_9} \end{array} \left\{ \begin{array}{ccccccccccc} n_0 + & n_1 + & & n_3 & & & & & & = & 0 \\ n_0 + & n_1 + & n_2 + & & n_4 & & & & & = & 1 \\ & n_1 + & n_2 + & & & n_5 & & & & = & 0 \\ n_0 + & & & n_3 + & n_4 + & & n_6 & & & = & 0 \\ & n_1 + & & n_3 + & n_4 + & n_5 + & & n_7 & & = & 0 \\ & & n_2 + & & n_4 + & n_5 + & & & n_8 & = & 0 \\ & & & n_3 + & & & n_6 + & n_7 & & = & 0 \\ & & & & n_4 + & & n_6 + & n_7 + & n_8 & = & 0 \\ & & & & & n_5 + & & n_7 + & n_8 & = & 1 \end{array} \right.$$

$$\begin{array}{c} {\color{red}L_1} \\ {\color{red}L_1 - L_2} \\ {\color{red}L_3} \\ {\color{red}L_1 - L_4} \\ {\color{red}L_5} \\ {\color{red}L_6} \\ {\color{red}L_7} \\ {\color{red}L_8} \\ {\color{red}L_9} \end{array} \left\{ \begin{array}{ccccccccccc} n_0 + & n_1 + & & n_3 & & & & & & = & 0 \\ & - & n_2 + & n_3 - & n_4 & & & & & = & -1 \\ & n_1 + & n_2 + & & & n_5 & & & & = & 0 \\ & n_1 + & & - & n_4 & - & n_6 & & & = & 0 \\ & n_1 + & & n_3 + & n_4 + & n_5 + & & n_7 + & & = & 0 \\ & & n_2 + & & n_4 + & n_5 + & & & n_8 & = & 0 \\ & & & n_3 + & & & n_6 + & n_7 + & & = & 0 \\ & & & & n_4 + & & n_6 + & n_7 + & n_8 & = & 0 \\ & & & & & n_5 + & & n_7 + & n_8 & = & 1 \end{array} \right.$$

$$\begin{array}{c} {\color{red}L_1} \\ {\color{red}L_3} \\ {\color{red}L_2} \\ {\color{red}L_4} \\ {\color{red}L_5} \\ {\color{red}L_6} \\ {\color{red}L_7} \\ {\color{red}L_8} \\ {\color{red}L_9} \end{array} \left\{ \begin{array}{ccccccccccc} n_0 + & n_1 + & & n_3 & & & & & & = & 0 \\ & n_1 + & n_2 + & & & n_5 & & & & = & 0 \\ & - & n_2 + & n_3 - & n_4 & & & & & = & -1 \\ & n_1 + & & - & n_4 & - & n_6 & & & = & 0 \\ & n_1 + & & n_3 + & n_4 + & n_5 + & & n_7 & & = & 0 \\ & & n_2 + & & n_4 + & n_5 + & & & n_8 & = & 0 \\ & & & n_3 + & & & n_6 + & n_7 & & = & 0 \\ & & & & n_4 + & & n_6 + & n_7 + & n_8 & = & 0 \\ & & & & & n_5 + & & n_7 + & n_8 & = & 1 \end{array} \right.$$

$$\begin{array}{c} {\color{red}L_1} \\ {\color{red}L_2} \\ {\color{red}L_3} \\ {\color{red}L_2 - L_4} \\ {\color{red}L_2 - L_5} \\ {\color{red}L_6} \\ {\color{red}L_7} \\ {\color{red}L_8} \\ {\color{red}L_9} \end{array} \left\{ \begin{array}{ccccccccccc} n_0 + & n_1 + & & n_3 & & & & & & = & 0 \\ & n_1 + & n_2 + & & & n_5 & & & & = & 0 \\ & - & n_2 + & n_3 - & n_4 & & & & & = & -1 \\ & & n_2 & + & n_4 + & n_5 + & n_6 & & & = & 0 \\ & & n_2 - & n_3 - & n_4 + & & - & n_7 & & = & 0 \\ & & n_2 + & & n_4 + & n_5 + & & & n_8 & = & 0 \\ & & & n_3 + & & & n_6 + & n_7 & & = & 0 \\ & & & & n_4 + & & n_6 + & n_7 + & n_8 & = & 0 \\ & & & & & n_5 + & & n_7 + & n_8 & = & 1 \end{array} \right.$$

$$
\begin{aligned}
z_1 &= z_0 + Re^{i\theta} \\
z_2 &= z_1 + R'e^{i\theta'} \\
&= z_0 + Re^{i\theta} + R'e^{i\theta'} \\
z_3 &= z_2 + R''e^{i\theta''} \\
&= z_0 + Re^{i\theta} + R'e^{i\theta'} + R''e^{i\theta''}
\end{aligned}
$$

$$\widehat{z_k} = \sum_{n=0}^{N-1} z_n e^{-\frac{2i\pi kn}{N}}$$

$$
\begin{aligned}
\widehat{z_0} &= z_0 e^{-\frac{2i\pi\times 0\times 0}{N}} + z_1 e^{-\frac{2i\pi\times 0\times 1}{N}} + ... + z_{N-1} e^{-\frac{2i\pi\times 0\times (N-1)}{N}} \\
&= z_0 + z_1 + ... + z_{N-1} \\
\widehat{z_1} &= z_0 e^{-\frac{2i\pi\times 1\times 0}{N}} + z_1 e^{-\frac{2i\pi\times 1\times 1}{N}} + ... + z_{N-1} e^{-\frac{2i\pi\times 1\times (N-1)}{N}} \\
&= z_0 + z_1 e^{-\frac{2i\pi}{N}} + ... + z_{N-1} e^{-\frac{2i\pi (N-1)}{N}} \\
&\vdots \\
\widehat{z_{N-1}} &= z_0 e^{-\frac{2i\pi\times (N-1)\times 0}{N}} + z_1 e^{-\frac{2i\pi\times (N-1)\times 1}{N}} + ... + z_{N-1} e^{-\frac{2i\pi\times (N-1)\times (N-1)}{N}}
\end{aligned}
$$

$$z_n = \frac{1}{N} \sum_{k=0}^{N-1} \widehat{z_k} e^{\frac{2i\pi nk}{N}}$$

On pose $f(t) = \dfrac{1}{N} \displaystyle\sum_{k=0}^{N-1} \widehat{z_k} e^{ikt}$

On a alors $f\left(\dfrac{2\pi n}{N}\right) = z_n$