

$$\begin{aligned}
& \sum_{k=-\infty}^{\infty} \chi_{k-1} \cos(k\pi/n) \\
&= \sum_{k=-\infty}^{\infty} \chi_k \cos[(k+1)\pi/n] \\
&= \sum_{k=-\infty}^{\infty} \chi_k [\cos(k\pi/n) \cos(\pi/n) - \sin(k\pi/n) \sin(\pi/n)] \\
&= a_n(\chi) \cos(\pi/n) - b_n(\chi) \sin(\pi/n)
\end{aligned}$$

$$\begin{aligned}
& \sum_{k=-\infty}^{\infty} \chi_{k-1} \sin(k\pi/n) \\
&= \sum_{k=-\infty}^{\infty} \chi_k \sin[(k+1)\pi/n] \\
&= \sum_{k=-\infty}^{\infty} \chi_k [\sin(k\pi/n) \cos(\pi/n) + \cos(k\pi/n) \sin(\pi/n)] \\
&= b_n(\chi) \cos(\pi/n) + a_n(\chi) \sin(\pi/n)
\end{aligned}$$