

演習

$$\begin{aligned}
 a_0 &= \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) dx \\
 &= \frac{1}{\pi} \left(\int_{-\pi}^0 1 \cdot dx + \int_0^{\pi} 0 \cdot dx \right) \\
 &= \frac{1}{\pi} (0 - (-\pi)) \\
 &= \boxed{1}
 \end{aligned}$$

$$\begin{aligned}
 a_k &= \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos kx dx \\
 &= \frac{1}{\pi} \left(\int_{-\pi}^0 1 \cdot \cos kx dx + \int_0^{\pi} 0 \cdot \cos kx dx \right) \\
 &= \frac{1}{\pi} \left[\frac{1}{k} \sin kx \right]_{-\pi}^0 \\
 &= \boxed{0}
 \end{aligned}$$

$$\begin{aligned}
 b_k &= \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin kx dx \\
 &= \frac{1}{\pi} \left(\int_{-\pi}^0 1 \cdot \sin kx dx + \int_0^{\pi} 0 \cdot \sin kx dx \right) \\
 &= \frac{1}{\pi} \left[-\frac{1}{k} \cos kx \right]_{-\pi}^0 \\
 &= \begin{cases} -\frac{2}{\pi k} & (k \text{ が 奇数}) \\ 0 & (k \text{ が 偶数}) \end{cases}
 \end{aligned}$$

k	0	1	2	3	4	5	6	7
a_k	1	0	0	0	0	0	0	0
b_k	1	$-\frac{2}{\pi}$	0	$-\frac{2}{3\pi}$	0	$-\frac{2}{5\pi}$	0	$-\frac{2}{7\pi}$