応数Ⅰ（フーリエ） 課題５

H30 年度 番号　　4

複素数の復習

例題 9-1, 9-2 を参考に章末問題の[演習 1]～[演習 3]を行う.

［演習 1]

(1) $e^{j\frac{2\pi}{3}}$

(2) $e^{-j*\left(\frac{3\pi}{4}\right)}$

[演習 2]

(1) $\left(-\frac{\sqrt{2}}{2}+j*\frac{\sqrt{2}}{2}\right)$

(2) $\left(\frac{1}{2}-j*\frac{\sqrt{3}}{2}\right)$

[演習 3]

$$\cos\theta + j*\sin\theta = \frac{e^{j*\theta}+e^{j*\theta}+e^{-j*\theta}-e^{-j*\theta}}{2} = e^{j*\theta}$$

複素フーリエ級数・係数

例題 9-3, 9-4 を参考に章末問題の[演習 4]～[演習 5]を行う.

［演習 4]

(1) $C_0 = \frac{1}{2}\int_{-\frac{1}{2}}^{\frac{1}{2}} 1\ dt = \frac{1}{2}$

$$C_n = \frac{1}{2}\int_{-\frac{1}{2}}^{\frac{1}{2}} 1*e^{-jn\omega_o t}\ dt = \frac{1}{n\pi}\sin\frac{n\pi}{2}$$

(2)

$$f(t) = \frac{1}{2}+\frac{2}{\pi}cos\pi t - \frac{2}{3\pi}cos3\pi t + \cdots$$

(3)

$$c_0 = \frac{1}{2}, |c_1| = \frac{1}{\pi}, |c_2| = 0, |c_3| = \frac{1}{3\pi}, |c_4| = 0, |c_5| = \frac{1}{5\pi}$$

$$\theta_1 = 0, \theta_2 = 0, \theta_3 = -\pi, \theta_4 = 0, \theta_5 = 0$$

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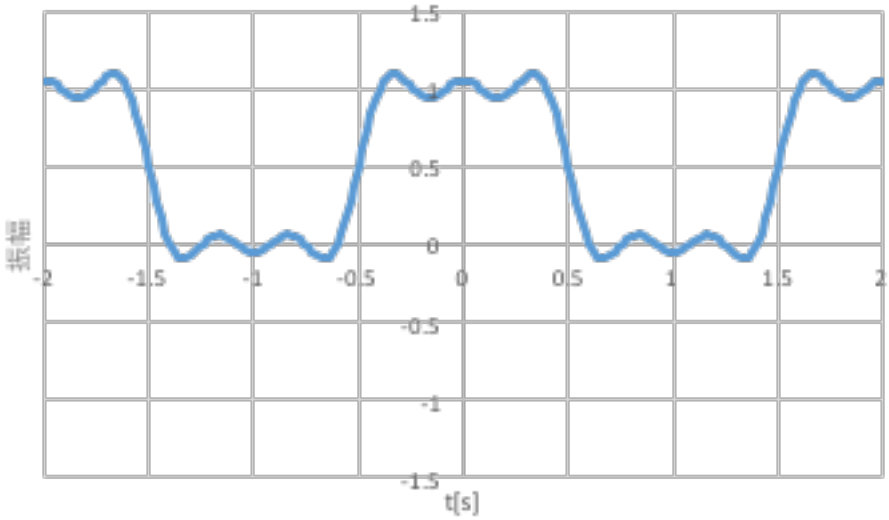
(4)



[演習 5]

(1)

$$c_0 = \frac{1}{2}\int_0^1 1\,dt = \frac{1}{2}$$

$$c_n = \frac{1}{2}\int_0^1 1 * e^{-jn\pi t}\,dt$$

$$= \frac{1}{n\pi}\sin\frac{n\pi}{2}\{\cos\frac{n\pi}{2} - j\sin\frac{n\pi}{2}\}$$

(2)

$$f(t) = \frac{1}{2} + \frac{2}{\pi}\sin\pi t + \frac{2}{3\pi}\sin 3\pi t \ + \cdot\cdot\cdot$$

(3)

$$c_0 = \frac{1}{2}, |c_1| = \frac{1}{\pi}, |c_2| = 0, |c_3| = \frac{1}{3\pi}, |c_4| = 0, |c_5| = \frac{1}{5\pi}$$

$$\theta_1 = -\frac{\pi}{2}, \theta_2 = 0, \theta_3 = -\frac{\pi}{2}, \theta_4 = 0, \theta_5 = -\frac{\pi}{2}$$

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