UAS Matematika 2
8 Juni 2021

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$\boxed{1}$ $\left(\frac{d^2}{dx^2} + 6\frac{d}{dx} + 13\right) \overset{2}{y} = 0$

Persamaan karakteristiknya $\longrightarrow$ $D^2 + 6D + 13 = 0$

$$D_{1\,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-6 \pm \sqrt{(6)^2 - 4(1)(13)}}{2(1)}$$

$$= \frac{-6 \pm \sqrt{36 - 52}}{2}$$

$$= \frac{-6 \pm \sqrt{-16}}{2}$$

$$= \frac{-6 \pm 4i}{2}$$

$$= -3 \pm 2i$$

Solusi

$$y = e^{-3x}(C_1 \cos 2x + C_2 \sin 2x)$$

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2

$$\int_0^\infty \frac{\sin(x)}{x^a}\,dx = \frac{\pi}{2\Gamma(a)\sin\left(\frac{a\pi}{2}\right)}$$

untuk
$0 < a < 1$, hitung

$$\int_0^\infty \sin(x^2)\,dx$$

$$\frac{1}{3}$$

↳ Penyelesaian

$$= \sqrt{\frac{\pi}{2}}$$

$$= \sqrt{\frac{\pi}{2}}\, S\left(\sqrt{\frac{2}{\pi}}x\right) + C$$

langkah. $d_1 = \int_0^\infty \frac{\sin(x)}{x^a}$

d_2 = hitung $\int_0^\infty \sin(x^2)\,dx$

$d_3 = \int_0^\infty e^{\pi x^{1/2}}\,dx = \Gamma(\alpha 1)\sin\left(\frac{\pi\alpha}{2}\right)$

$= \int_0^\infty \sin(\alpha^{1/\alpha})\,dx = \Gamma(\alpha 1)\sin\left(\frac{\pi\alpha}{2}\right)$

$= \int_0^\infty \sin(\alpha^N)\,dx$

$= \Gamma\left(\frac{1}{N}\alpha\right)\sin(\pi/2N)$

$= \int_0^\infty \sin(x^2)\,dx$

$= \Gamma\left(\frac{3}{2}\right)\sin(\pi/4)$

$= \frac{1}{2}\Gamma(1/2)\,1/\sqrt{2}$ dijabarkan ke bentuk awal

$= \sqrt{\frac{\pi}{8}} = \sqrt{\frac{\pi}{8}}$ $\rightarrow \frac{\sqrt{\pi}}{\sqrt{2}}\, S\left(\frac{\sqrt{2\pi}}{\sqrt{\pi}}\right) + C$

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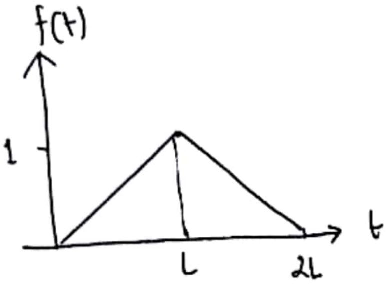
13



Periode = 2L

Penentuan deret Fourier

$a_0 = \frac{1}{1} \int_1^2 f(x)\, dx$

$a_0 = \int_0^1 x\, dx + \int_1^2 (-x+2)\, dx$

$= \frac{1}{2} + \frac{1}{2} = 1$

Jika f(x) genap

$a_n = \frac{1}{L} \int_{-L}^{L} f(x) \cos\left(\frac{n\pi x}{L}\right) dx$

$b_n = 0$

Jika fungsi ganjil

$a_n = 0$

$b_n = \frac{1}{L} \int_{-L}^{L} f(x) \sin\left(\frac{n\pi x}{L}\right) dx.$

$a_n = \frac{1}{1} \int_0^2 f(x) \cos n\pi x\, dx$

$= \int_0^1 x \cos n\pi x\, dx + \int_1^2 (-x+2) \cos n\pi x\, dx.$

$= \frac{\pi n \sin(n\pi) + \cos(n\pi) - 1}{\pi^2 n^2} + \left(-\frac{\cos(2n\pi) + n\pi \sin(n\pi) - \cos(n\pi)}{\pi^2 n^2}\right)$

$b_n = \frac{1}{1} \int_0^2 f(x) \sin n\pi x\, dx$

$= \int_0^1 x \sin n\pi x\, dx + \int_1^2 (-x+2) \sin n\pi x\, dx$

$= \frac{\sin(n\pi) - n\pi \cos(n\pi)}{\pi^2 n^2} + \left(-\frac{\sin(2n\pi) - \sin(n\pi) - n\pi \cos(n\pi)}{\pi^2 n^2}\right)$

$= \frac{2\sin(n\pi) - \sin(2n\pi)}{\pi^2 n^2}$

Maka deret Fouriernya adalah

$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n \sin nx$

$= \frac{1}{2} - \frac{1}{\pi^2}\left(\cos x + \frac{\cos x}{4} + \frac{\cos x}{9} + \dots\right)$