Adı ve Soyadı: Hamdi Utku Parali

Numara: 19253510

Cevap 1

$r = 2(1+\cos\theta)$

$n = 6$

$0° \leq \theta \leq 20°$

$\Delta\theta = \frac{20-0}{6} = \frac{10}{3}$

$$S_n = \frac{\Delta\theta}{3}\left[f(\theta_0) + 4f(\theta_1) + 2f(\theta_2) + \dots + 4f(\theta_{n-1}) + f(\theta_n)\right]$$

$$l = \int_a^b \underbrace{\sqrt{1 + \left(\frac{dr}{d\theta}\right)^2}}_{f(\theta)}\, d\theta$$

$$f(\theta) = \sqrt{1 + (-2\sin\theta)^2}$$

$$f(\theta) = \sqrt{1 + 4\sin^2\theta}$$

$\theta_0 = 0°$ $\theta_1 = \frac{10°}{3}$ $\theta_2 = \frac{20°}{3}$ $\theta_3 = 10°$

$\theta_4 = \frac{40°}{3}$ $\theta_5 = \frac{50°}{3}$ $\theta_6 = 20°$

$$S_6 = \frac{10}{9}\left[f(0) + f(20) + 4\left(f(\tfrac{10}{3}) + f(10) + f(\tfrac{50}{3})\right) + 2\left(f(\tfrac{20}{3}) + f(\tfrac{40}{3})\right)\right.$$

$$S_6 = \frac{10}{9}\left[1 + 1{,}211 + 4.(1 + 1{,}058 + 1{,}153) + 2(1{,}027 + 1{,}101)\right]$$

$S_6 = 21{,}49$

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Cevap 2

$$A=\begin{bmatrix}1&1&1\\1&2&2\\1&2&3\end{bmatrix}=\begin{bmatrix}u_{11}&0&0\\u_{12}&u_{22}&0\\u_{13}&u_{23}&u_{33}\end{bmatrix}\begin{bmatrix}u_{11}&u_{12}&u_{13}\\0&u_{22}&u_{23}\\0&0&u_{33}\end{bmatrix}$$

$u_{11}=\sqrt{a_{11}}=\sqrt{1}=1$ $\quad u_{22}=\sqrt{a_{22}-u_{12}}=\sqrt{2-1}=1$

$u_{12}=\frac{a_{12}}{u_{11}}=\frac{1}{1}=1$ $\quad u_{23}=\frac{a_{23}-u_{12}u_{13}}{u_{22}}=\frac{2-1.1}{1}=1$

$u_{13}=\frac{a_{13}}{u_{11}}=\frac{1}{1}=1$ $\quad u_{33}=\sqrt{a_{33}-(u_{13}^2+u_{23}^2)}=\sqrt{3-(1^2+1^2)}=1$

$UY=B$ eşitliği

$$\begin{bmatrix}1&0&0\\1&1&0\\1&1&1\end{bmatrix}\begin{bmatrix}y_1\\y_2\\y_3\end{bmatrix}=\begin{bmatrix}10\\24\\36\end{bmatrix}$$

$y_1=10$ $\quad y_1+y_2=24$ $\quad y_1+y_2+y_3=36$

$y_2=14$

$y_3=12$

$$\begin{bmatrix}1&1&1\\0&1&1\\0&0&1\end{bmatrix}\begin{bmatrix}x_1\\x_2\\x_3\end{bmatrix}=\begin{bmatrix}10\\14\\12\end{bmatrix}$$

$x_1+x_2+x_3=10$ $\quad x_2+x_3=14$ $\quad x_3=12$

$x_1=x=-4$

$x_2=y=2$

$x_3=z=12$ //

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Cevap 3

indis	0	1	2	3	4	5
x	2	2,2	2,4	2,6	2,8	3
$y=\log(x)$	0,301	0,342	0,380	0,415	0,447	0,447

I) $\Delta y_0 = \frac{y_1 - y_0}{x_1 - x_0} = \frac{0,342 - 0,301}{2,2 - 2} = 0,207$

$\Delta y_1 = \frac{y_2 - y_1}{x_2 - x_1} = 0,189$

$\Delta y_2 = \frac{y_3 - y_2}{x_3 - x_2} = 0,174$

$\Delta y_3 = \frac{y_4 - y_3}{x_4 - x_3} = 0,161$

$\Delta y_4 = \frac{y_5 - y_4}{x_5 - x_4} = 0,145$

II) $\Delta^2 y_0 = \frac{\Delta y_1 - \Delta y_0}{x_2 - x_0} = \frac{0,189 - 0,207}{2,4 - 2} = -0,045$

$\Delta^2 y_1 = \frac{\Delta y_2 - \Delta y_1}{x_3 - x_1} = -0,038$

$\Delta^2 y_2 = \frac{\Delta y_3 - \Delta y_2}{x_4 - x_2} = -0,032$

$\Delta^2 y_3 = \frac{\Delta y_4 - \Delta y_3}{x_5 - x_3} = -0,028$

III) $\Delta^3 y_0 = \frac{\Delta^2 y_1 - \Delta^2 y_0}{x_3 - x_0} = \frac{-0,038 - (-0,045)}{2,6 - 2} = 0,017$

$\Delta^3 y_1 = \frac{\Delta^2 y_2 - \Delta^2 y_1}{x_4 - x_1} = 0,009$

$\Delta^3 y_2 = \frac{\Delta^2 y_3 - \Delta^2 y_2}{x_5 - x_2} = 0,007$

IV) $\Delta^4 y_0 = \frac{\Delta^3 y_1 - \Delta^3 y_0}{x_4 - x_0} = \frac{0,009 - 0,017}{2,8 - 2} = -0,010$

$\Delta^4 y_1 = \frac{\Delta^3 y_2 - \Delta^3 y_1}{x_5 - x_1} = -0,003$

V) $\Delta^5 y_0 = \frac{\Delta^4 y_1 - \Delta^4 y_0}{x_5 - x_0} = 0,007$

VI)

indis	x	y	Δy	$\Delta^2 y$	$\Delta^3 y$	$\Delta^4 y$	$\Delta^5 y$
0	2	0,301	0,207	-0,045	0,017	-0,010	0,007
1	2,2	0,342	0,189	-0,038	0,009	-0,003	
2	2,4	0,380	0,174	-0,032	0,007		
3	2,6	0,415	0,161	-0,028			
4	2,8	0,447	0,145				
5	3	0,447					

VII) $P_5(x) = y_0 + \Delta y_0 (x - x_0) + \Delta^2 y_0 (x - x_0).(x - x_1) + \Delta^3 y_0 (x - x_0)(x - x_1)(x - x_2) +$

$\Delta^4 y_0 (x - x_0).(x - x_1).(x - x_2)(x - x_3) + \Delta^5 y_0 . (x - x_0).(x - x_1)(x - x_2)(x - x_3)(x - x_4)$

$x = 2,5$

$P_5(2,5) = 0,301 + 0,207(2,5 - 2) + (-0,045).(2,5 - 2)(2,5 - 2,2) +$

$(0,017).(2,5 - 2)(2,5 - 2,2)(2,5 - 2,4) + (-0,010).(2,5 - 2)(2,5 - 2,2)(2,5 - 2,4)(2,5 - 2,6)$

$(0,007).(2,5 - 2)(2,5 - 2,2)(2,5 - 2,4)(2,5 - 2,6)(2,5 - 2,8)$

$P_5(2,5) = \log(2,5) = 0,398$ //

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Cevap 4

$y = a.e^{bx}$

$\ln y = \ln a + bx$

$Y = \ln y \quad A = \ln a \quad x = x \quad \Rightarrow \quad Y = A + bx$

						Σ
x_i	0	5	10	15	20	50
y_i	100	232	431	968	2011	
$Y_i = \ln y_i$	4,605	5,447	6,066	6,875	7,606	30,599
x_i^2	0	25	100	225	400	750
$x_i . y_i$	0	27,235	60,66	103,125	152,128	343,148

$$50A + 750b = 343,148$$

$$-10/5A + 50b = 30,599$$

$$+ \quad 250b = 37,158$$

$$b = 0,149$$

$$A = 4,633$$

$A = \ln a \Rightarrow 4,633 = \ln a \Rightarrow a = e^{4,633} \simeq 103$

$y = 103.e^{0,149.x}$

$y = 103.e^{0,149.25}$

$y \simeq 4271$ //