Quiz KVJ

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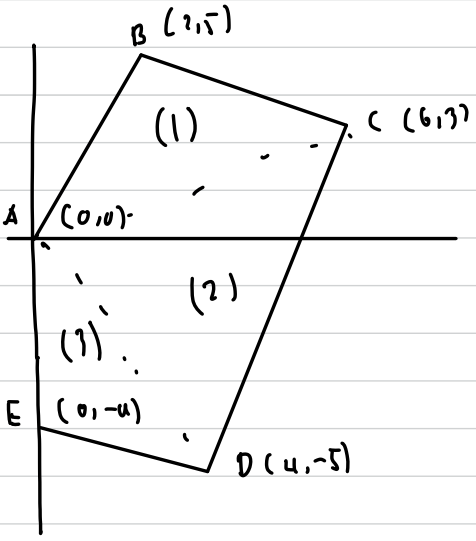
Materi 1-2

1) luas R

A(0,0), B(2,5), C(6,3), D(4,-5)
E(0,-4)

Interpretasi Determinan = luas jajar genjang

$L\Delta$ = luas jajar genjang /2



$L = L\Delta ABC + L\Delta ACD + L\Delta AED$

$= \frac{\begin{vmatrix} 6 & 3 & 1 \\ 2 & 5 & 1 \\ 0 & 0 & 1 \end{vmatrix}}{2} + \frac{\begin{vmatrix} 6 & 3 & 1 \\ 4 & -5 & 1 \\ 0 & 0 & 1 \end{vmatrix}}{2} + \frac{\begin{vmatrix} 4 & -5 & 1 \\ 6 & -4 & 1 \\ 0 & 0 & 1 \end{vmatrix}}{2}$

$= 24 + |-42| + |-16| / 2$

$= 41$ //

2) Persamaan bidang titik A(2,0,2), B(0,4,4) dan C(1,1,0)

$\bar{AB} = (-2, 4, 2)$
$\bar{AC} = (-1, 1, -2)$

$\bar{N} = \bar{AB} \times \bar{AC}$

$= \begin{vmatrix} i & j & k \\ -2 & 4 & 2 \\ -1 & 1 & -2 \end{vmatrix}$

$(-8-2)i - (4+2)j + (-2+4)k$

$-10i - 6j + 2k = \bar{N}$

Pers bidang : $\bar{N} \cdot \bar{AB} = 0$

Persamaan umum

$ax + by + cz = d$

$d = ax_0 + by_0 + zy_0$

$(a, b, c) = \bar{N} = (-10, -6, 2)$

$d = -10(2) + (-6)(0) + 2(2)$
$= -20 + 4 = -16$

Pers bidang : $-10x - 6y + 2z = -16$
$10x + 6y - 2z = 16$ //

Materi 3-4

3) Critical point $f(x,y) = -x^2 + y^2$

$f_x = -2x = 0$ $\quad f_y = 2y = 0$

$x = 0$ $\quad y = 0$

$f_{xx} = -2$ $\quad f_{yy} = 2$

$f_{xy} = 0$ titik pertama (0,0)

$D(x,y) = f_{xx} \cdot f_{yy} - \left((f_{xy})^2\right)$

$D(0,0) = -2 \cdot 2 - (0^2)$

$= -4 < 0$ saddle point

Titik (0,0) adalah saddle point.

4) Kurvatur dari fungsi vektor

$r(t) = 5(t)i + 3\sin(t)j + 3\cos(t)k$

$\bar{T} = \frac{\bar{V}t}{\|\bar{V}t\|} = \frac{\bar{r}'t}{\|\bar{r}'t\|}$

$\bar{r}'(t) = 5i + 3\cos(t)j + 3\sin(t)k$

$\|\bar{r}'t\| = \sqrt{25 + 9\cos^2 t + 9\sin^2 t}$

$= \sqrt{34}$ //

$\bar{T} = \frac{5i + 3\cos t\, j + 3\sin(t)k}{\sqrt{34}}$

$$\bar{T} = \frac{5i + 3\cos t\, j + 3\sin(t)\, k}{\sqrt{34}}$$

$$\|\bar{T}'\| = \frac{1}{\sqrt{34}} \| 3\sin t\, j + 3\cos t\, k \|$$

$$= \frac{1}{\sqrt{34}} (3)$$

$$K = \frac{\|\bar{T}'\|}{\|\bar{v}(t)\|} = \frac{\frac{3}{\sqrt{34}}}{\sqrt{34}} = \frac{3}{34}$$ //

Quiz 5-6

5) $\theta = xy^2 + 6z^3x^2$

$\nabla\theta$ dan $|\nabla\theta|$ $(6,2,2)$

$$\nabla\theta = \left(\frac{\delta\theta}{\delta x}, \frac{\delta\theta}{\delta y}, \frac{\delta\theta}{\delta z}\right)$$

$$= (y^2 + 12z^3x,\ 2xy,\ 18x^2z^2) \Big|_{(6,2,2)}$$

$$\nabla\theta = (580, 24, 2592)$$

$$|\nabla\theta| = \sqrt{580^2 + 24^2 + 2592^2}$$

$$= 2656{,}2$$ //

6) maksimum & minimum

$f(x,y) = 6x + 4y$ pada lingkaran

$g(x,y) = x^2 + y^2$

$$\nabla f(x,y) = \lambda \nabla g(x,y)$$

$$(6,4) = \lambda(2x, 2y)$$

$6 = 2x\lambda$ | $4 = 2y\lambda$

$\frac{3}{x} = \lambda$ | $\frac{2}{y} = \lambda$

$\frac{3}{\lambda} = x$ | $\frac{2}{\lambda} = y$

$$g\left(\frac{3}{\lambda}, \frac{2}{\lambda}\right) = \frac{9}{\lambda^2} + \frac{4}{\lambda^2} = 0$$

$$= \frac{13}{\lambda^2} = 0$$

$=$

max $(3,2)$

min $(0,0)$

Quiz Matri 8

7) $\delta(x,y) = \frac{1}{\sqrt{x^2+y^2}} = \frac{1}{r^2}$

a) abaut x axis $\quad 1 \le r \le 2,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

$$I_x = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \int_1^2 y^2 \delta(x,y)\, dr\, d\theta$$

$$= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \int_1^2 r^2\sin^2\theta \frac{1}{r}\, dr\, d\theta$$

$$= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2\theta \left(r\Big|_1^2\right) d\theta$$

$$= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2\theta\, d\theta$$

$$= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{1}{2}(1 - \cos 2\theta)\, d\theta$$

$$= \frac{1}{2}\left|\theta - \right|_{-\frac{\pi}{2}}^{\frac{\pi}{2}}$$

$$= \frac{1}{2}\left(\left(\frac{\pi}{2} - 1\right) - \left(-\frac{\pi}{2} + 1\right)\right)$$

$$= \frac{1}{2}(\pi - 2) = \frac{\pi}{2} - 2$$