

## TUGAS PRAKTIKUM PERTEMUAN 6

### PENGANTAR MATEMATIKA KOMPUTASIONAL

1. Tentukan nilai maksimum dan minimum lokal dari fungsi:

$$f(x, y) = 11x^3 + 4y^3 - 8y - 66$$

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Tentukan nilai maks & min lokal dr

$$f(x, y) = 11x^3 + 4y^3 - 8y - 66$$

$$f_x(x, y) = 0$$

$$f_y(x, y) = 0$$

$$f(a, b) = (0, \sqrt{\frac{2}{3}})$$

$$33x^2 = 0$$

$$12y^2 - 8 = 0$$

$$a = 0$$

$$12y^2 = 8$$

$$y^2 = \frac{2}{3}$$

$$b = \sqrt{\frac{2}{3}}$$

$$f_{xx}(x, y) = 66x$$

$$D(a, b) = f_{xx} \cdot f_{yy} - (f_{xy})^2$$

$$f_{xy}(x, y) = 0$$

$$= 66(0) \cdot 24\left(\sqrt{\frac{2}{3}}\right) - 0^2$$

$$f_{yy}(x, y) = 24y$$

$$= 0$$

$$\rightarrow D = 0$$

karena  $D=0$  maka maks lokal & min lokal tdk dpt disimpulkan

2. Tentukan nilai maksimum dan minimum mutlak dari fungsi:

$$f(x,y) = x^2 + y^2 + x^2y + 8$$

Pada  $D = \{(x,y) | |x| \leq 1, |y| \leq 1\}$

Tentukan nilai maks dan min mutlak dari

$$f(x,y) = x^2 + y^2 + x^2y + 8$$

pada  $D = \{(x,y) | |x| \leq 1, |y| \leq 1\}$

$$f_x(x,y) = 0$$

$$f_y(x,y) = 0$$

$$f(a,b) = (0,0)$$

$$2x + 2xy = 0$$

$$2y + x^2 = 0$$

$$= (\sqrt{2}, -1)$$

$$\bullet \quad 2x + \cancel{2x} - x^2 = 0$$

$$2y = -x^2$$

$$= (-\sqrt{2}, -1)$$

$$y = -\frac{x^2}{2}$$

$$2x - x^3 = 0$$

$$x(2 - x^2) = 0$$

$$\bullet \quad 2y + 2 = 0$$

$$2 - x^2 = 0$$

$$2y = -2$$

$$x^2 = 2$$

$$y = -1$$

$$a = \pm\sqrt{2}$$

$$b = -1$$

4 batas yaitu :  $x = \pm 1, y = \pm 1$

$$\rightarrow \text{utk } x = -1, f(-1,y) = 1 + y^2 + y + 8 = y^2 + y + 9, |y| \leq 1$$

$$f_y(-1,y) = 0$$

$$2y + 1 = 0$$

$$y = -0,5$$

$$f(-1, -0,5) = (-0,5)^2 + (-0,5) + 9 = 8,75$$

$$\text{TUS : } y = -1 \rightarrow f(-1, -1) = (-1)^2 + (-1) + 9 = 9$$

$$y = 1 \rightarrow f(-1, 1) = (1)^2 + 1 + 9 = 11$$

$$\rightarrow \text{utk } x = 1, f(1,y) = 1 + y^2 + y + 8 = y^2 + y + 9, |y| \leq 1$$

$$f_y(1,y) = 0$$

$$2y + 1 = 0$$

$$y = -0,5$$

$$f(1, -0,5) = (-0,5)^2 + (-0,5) + 9 = 8,75$$

$$\text{TUS : } y = -1 \rightarrow f(1, -1) = (-1)^2 + (-1) + 9 = 9$$

$$y = 1 \rightarrow f(1, 1) = 1^2 + 1 + 9 = 11$$

$$\rightarrow \text{Utk } y = -1, f(x, -1) = x^2 + 1 - x^2 + 8 = 9, |x| \leq 1$$

$$\text{TUS: } x = -1 \rightarrow f(-1, -1) = 9$$

$$x = 1 \rightarrow f(1, -1) = 9$$

$$\rightarrow \text{Utk } y = 1, f(x, 1) = x^2 + 1 + x^2 + 8 = 2x^2 + 9, |x| \leq 1$$

$$\text{TUS: } x = -1 \rightarrow f(-1, 1) = 2(-1)^2 + 9 = 11$$

$$x = 1 \rightarrow f(1, 1) = 2(1)^2 + 9 = 11$$

Pada titik (0,0) nilai  $f(x,y)$  adalah 8

Pada batas :  $x = -1$ , nilai terbesar = 11, nilai terkecil = 8,75

"  $x = 1$ , " 11 " 8,75

"  $y = -1$ , " 9, " 9

"  $y = 1$ , " 11, " 11

Jadi maksimum global 11 dan minimum global 8