

11.10.20

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1) Menentukan Area rangkai: $\mathbb{R}^3 + \mathbb{R}$

$$x^2 \frac{\partial y}{\partial x} + y^3 \frac{\partial y}{\partial y} + z^2 \frac{\partial y}{\partial z} = 0$$

sehingga $u(x, y, z) = e^x \cos y$
merupakan solusi pada $(1, 1, 1)$.

Resolusi:

Resolusi dari f

$$\begin{aligned} \frac{dx}{ds} &= x^2 & \Rightarrow & \frac{d}{ds} \left(-\frac{1}{x} \right) = z \\ \frac{dy}{ds} &= y^3 & \Rightarrow & \frac{d}{ds} (\ln|z|) = z \end{aligned} \quad \left. \begin{aligned} & \\ & \end{aligned} \right\} \textcircled{2} \frac{d}{ds} (\ln|z| + \frac{1}{x}) = 0$$

$$\begin{aligned} \frac{dz}{ds} &= z^2 & \Rightarrow & \frac{d}{ds} \left(-\frac{1}{z} \right) = 1 \\ & & \Rightarrow & \frac{d}{ds} \left(-\frac{1}{z} \right) = 1 \end{aligned} \quad \textcircled{2} \frac{d}{ds} \left(\frac{1}{z} - \frac{1}{2y^2} \right) = 0$$

$$\textcircled{1} u(x, y, z) = 4 \left(\ln|z| + \frac{1}{x}, \frac{1}{z} - \frac{1}{2y^2} \right) \quad \text{-- Area pada maksimum?}$$

$$u(x, y, z) = e^x \cos y = 4 \left(\frac{1}{x}, \frac{1 - \frac{1}{2y^2}}{2} \right) = e^{\frac{1}{v_1}} \cdot \cos \left(\sqrt{\frac{1}{2(1 - v_2)}} \right)$$

$$u(x, y, z) = e^{\frac{1}{\ln z + \frac{1}{x}}} \cos \left(\sqrt{\frac{1}{2(1 - \frac{1}{z} + \frac{1}{2y^2})}} \right) \quad (x, y, z) = u(1, 1, 1)$$

2) Nalezněte rovnici roviny

20b) $\frac{\partial u}{\partial x} + x \frac{\partial u}{\partial y} = 1(x+y)$

její slouží jako $u(x,y) = \cos y$ no j'ím do bodu $(1,1)$.

Rovina

Meraj ϕ rovnice linie rovnice

$\frac{\partial w}{\partial x} + x \frac{\partial w}{\partial y} + (x+y) \frac{\partial w}{\partial z} = 0$ (3b)

a rovnice její charakteristické eq

$\frac{dx}{ds} = 1 \Rightarrow x = x_0 + s$
 (2) $\frac{dy}{ds} = x$ (3) $y = \frac{1}{2}s^2 + x_0s + y_0$
 $\frac{dz}{ds} = x+y$ $z = \frac{1}{6}s^3 + \frac{x_0+1}{2}s^2 + (x_0+y_0)s + z_0$ (2) souřadnice bodu (x_0, y_0, z_0)

Klademe $\Delta = 1 - x_0$ (1) $\Rightarrow \Delta = 1 - x_0$ (1)

Substituce $u(x,y) = \cos y$ (1)

$0 = z(s) - u(x(s), y(s)) = z(s) - \cos(y(s))$ (2)

$0 = z_0 + \frac{1}{6}(1-x_0)^3 + \frac{x_0+1}{2}(1-x_0)^2 + (x_0+y_0)(1-x_0) - \cos(\frac{1}{2}(1-x_0)^2 + x_0(1-x_0) + y_0)$ (2)

$u(x,y) = \cos(\frac{1}{2}(1-x)^2 + x(1-x) + y) - \frac{1}{6}(1-x)^3 - \frac{1}{2}(x+1)(1-x)^2 - (x+y)(1-x)$ (1)

$-\sin(\dots) \cdot [-\frac{1}{3} + 1 - 2x]$
 $\frac{1}{2}(1-2x+x^2) + x - x^2 = -\frac{1}{2}x^2 + \frac{1}{2}$

$(x,y) \text{ ke } u(x,y)$ (1)
 $-x + x^2 + \frac{1}{2}(1-x)^2 - \frac{1}{2}(1-x)^2 + (x+y)$
 $- (1-x) + y$ (1-x^2)