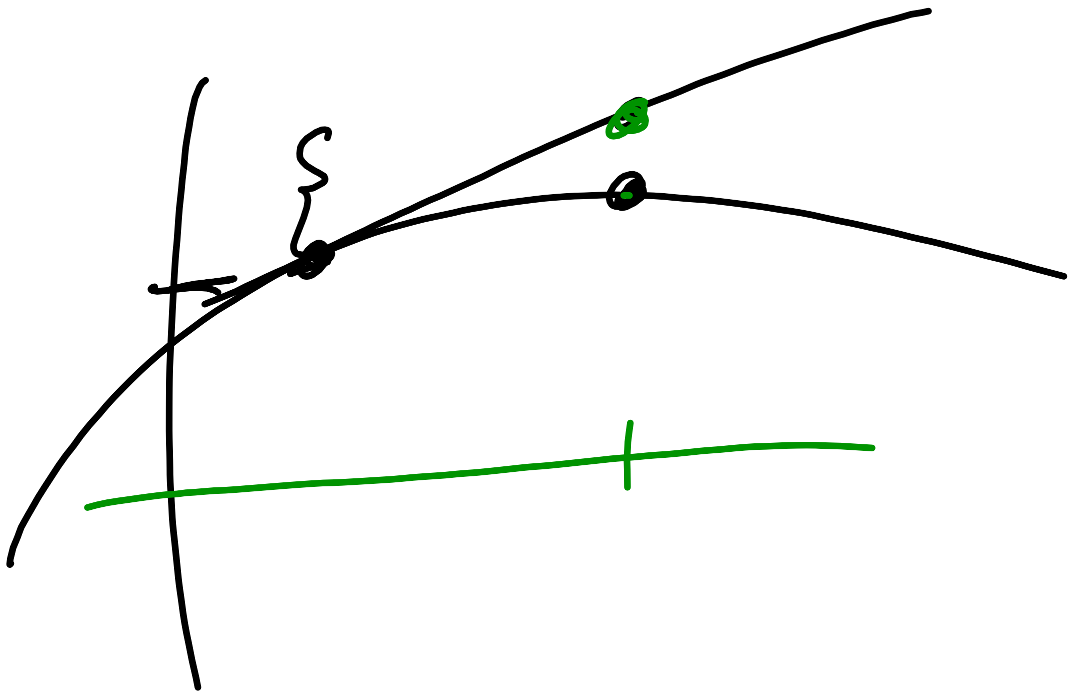
$$\sqrt{3{,}98} \rightarrow \sqrt{x} = f(x)$$

$$x_0 = 4 \quad \ldots.$$



$$f(x_1, x_2, x_3, x_4) \qquad [\underbrace{1, 2, 3, 4}_{\mathbb{X}_0}, ?]$$

$$f - f_0 = \frac{\partial f}{\partial x_1}(\mathbb{X}_0)\cdot(x_1 - 1) + \dots + \frac{\partial f}{\partial x_4}(\mathbb{X}_0)\cdot(x_4 - 4)$$

$H = ?$ $P, Q$

$H_x = P$

$H_y = Q$

$H_{xy} = H_{yx}$

$P_y = Q_x$

$$\begin{pmatrix} P \\ Q \end{pmatrix} : \mathbb{R}^2 \to \mathbb{R}^2$$

$$H_x = x^2 - y^2$$

$$H_y = 5 - 2xy$$

$$H_{xy} = H_{yx}$$

$$\frac{\partial (x^2 - y^2)}{\partial y} = \frac{\partial (5 - 2xy)}{\partial x}$$

$$-2y = -2y$$

$H_x = x^2 - y^2 \implies H(x,y) = \int H_x \, dx =$

$H_y = 5 - 2xy$

$= \int x^2 - y^2 \, dx = \frac{x^3}{3} - y^2 x + c(y)$

$\frac{\partial \left(\frac{x^3}{3} - y^2 x + c(y)\right)}{\partial y} = \ldots$

$$= 0 - \cancel{x \cdot 2y} + c'(y) = 5 - \cancel{2xy}$$

$$c'(y) = 5 \quad \Big| \int \cdot \, dy$$

$$c(y) = 5y + k$$

$$H(x,y) = \frac{x^3}{3} - xy^2 + 5y + k$$

$$k \in \mathbb{R}$$

$$a(x,y)\,dx + (-b(x,y))\,dy$$

$$P_y = Q_x$$

$$H_{xy} = H_{yx}$$

$H$ : $H_x = P$

$H_y = Q$

$H_z = R$

$$F(x,y) = f(u(x,y), v(x,y))$$

$$\frac{\sqrt{a^2+c^2}}{\sqrt{b^2}} = \sqrt{\frac{a^2}{b^2} + \frac{c^2}{b^2}}$$

$$z(u, v), \quad u = u(x,y)$$

$$v = v(x,y)$$

$$z_x = z_u \cdot u_x + z_v \cdot v_x$$

$$z(u,v) \qquad u=u(x,y),\ v=v(x,y)$$

$$z_{xx} = z_{uu}\cdot u_x^2 + 2 z_{uv}\, u_x \cdot v_x +$$
$$+ z_{vv}\cdot v_x^2 + z_u \cdot u_{xx} + z_v \cdot v_{xx}$$

$$5u_{xx} - 7u_{yy} = 0$$

$$\left(\sqrt{\frac{5}{7}}\right)^2 u_{xx} - u_{yy} = 0$$

$$\left(\alpha_{u}\right)_{v} = 0$$