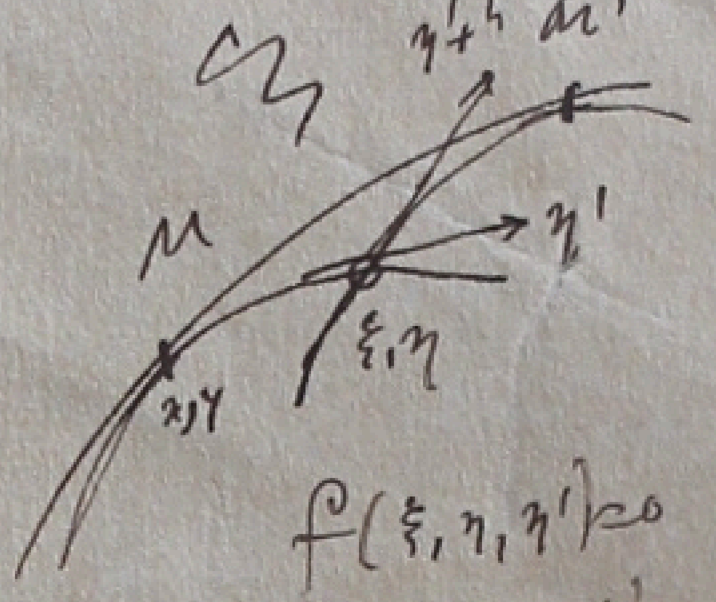


$f(\xi,\eta,\eta')=0$

$f'_{\eta'}(\xi,\eta,\eta'+\delta\eta')$

REGIA UNIVERSITÀ

DI

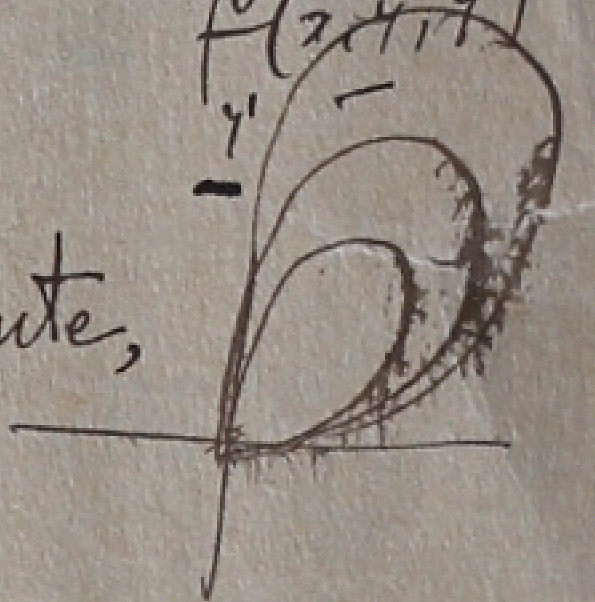
NAPOLI, 29 Maggio, 06.

$f(x,y,y')=0$

$$y - xy' = f(y')$$

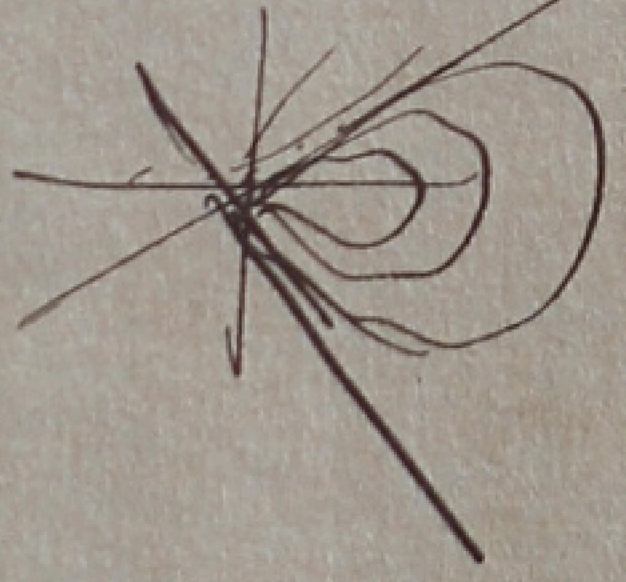
$$y = xy' + f(y')$$

$$0 = x + f'(y')$$



Illustrissimo Signor Presidente,

Aspirante al premio reale per le matematiche, dichiaro di ritirarmi dal concorso, e prego Lei, Sig.r Presidente, di voler fare che il mio nome non apparisca nella relazione. ~~E. Voglia~~



$\cancel{f(y,y',y'')}$ $\quad f(y,y',y'')$ $\quad f(x,y,y')=0$

$\cancel{x = y' - \log y'}$

$$x = y' - \operatorname{arctg} y' \qquad x = t - \operatorname{arct} t$$

$\cancel{udx + vdy = 0}$

$y = tx$

3° $f(x,y')=0$

$f(y,y')=0$

$$\frac{dy}{dx} = t\left(1-\frac{1}{1+t^2}\right)dt = tdt - \frac{tdt}{1+t^2}$$

$$y = \frac{t^2}{2} - \log\sqrt{1+t^2}$$

$f(x,y',y'')=0$ $\quad F(x,y',a)=0$

$f(y,y',y'')=0$ $\quad F(y,y',a)$

$$y' + y^2 = \frac{1}{x^4}$$

$y = uz + v \qquad u z' + u'z + v' + u^2z^2 + 2uvz + v^2 = \frac{1}{x^4}$

$v = \frac{1}{x}$, $u = \frac{1}{x^2}$ $\qquad \frac{u'}{u} + \frac{2v}{x} = 0 \qquad uz' + u^2 z^2 = \frac{1}{x^4}$

$y \sin x + y' \cos x = 1$

$\frac{y \sin x}{\cos x} + \frac{y'}{y} = 0 \qquad y = a \cos x$

$a' \cos x = \frac{1}{\cos x} \qquad a = \operatorname{tg} x + \alpha$

$z' = \frac{1 - z^2}{x^2} \qquad \frac{dz}{1-z^2} = \frac{dx}{x^2}$

$y' + ay^2 = bx^n$

$y \cos x + y' \sin x = 1 \qquad y = \sin x + \alpha \cos x$

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

$\frac{y'}{y} + \frac{\cos x}{\sin x} \qquad y = \frac{a}{\sin x} \qquad y = \frac{x+\alpha}{\sin x}$

$y = uz + v$

$\frac{1}{2} \ln \frac{1+z}{1-z} = + \frac{1}{x} + \alpha$

$uz' + u'z + v' + a(u^2z^2 + 2uvz + v^2) = bx^n$

$z = x(xy - 1)$

$(y \sin x)' = 1 \qquad y \sin x = x + \alpha \qquad \frac{a'}{\sin x} = 1 \qquad a = x + \alpha$

$v' + av^2 = 0$

$u' + 2auv = 0$

$z' + a\frac{z^2}{x^2} = bx^{n+2}$

$\frac{1}{2} \ln \frac{1 + x - x^2 y}{1 - x + x^2 y} = \frac{1}{x} + \alpha$

$(a^2 - x^2)dy^2 + 2xy\,dx\,dy + (b^2 - y^2)dx^2 = 0$

$\frac{v'}{v^2} = -a$

$v = \frac{1}{ax} \qquad u' + 2\frac{u}{x} = 0$

$(a^2 - x^2)y'^2 + 2xyy' + b^2 - y^2 = 0$

$a^2 dy^2 + b^2 dx^2 = (y\,dx - x\,dy)^2$

$u = \frac{1}{x^2}$

$y' = \frac{-xy \pm \sqrt{}}{a^2 - x^2}$

$y - xy' = \pm\sqrt{b^2 + a^2 y'^2}$

$\frac{u'}{u} + \frac{2}{x} = 0$

$y = xy' \pm \sqrt{b^2 + a^2 y'^2}$

$(a^2 - x^2)k^2 + 2kxy + b^2 - y^2 = 0$

$z' + a\frac{z^2}{x^2} = bx^{n+2} \qquad x$

$(a^2 - x^2)k + xy = 0 \qquad k = -\frac{xy}{a^2 - x^2}$

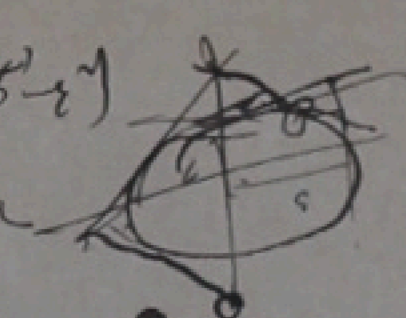
$x = x_1^{\mu}$

$x^2 y^2 = (a^2 - x^2)(b^2 - y^2)$

$dx = \mu x_1^{\mu - 1} dx_1$

$y^2 + \frac{1}{x^2} + 2y' = 0 \qquad \frac{(a^2 - x^2)x^2 y^2}{a^2 - x^2} + b^2 - y^2 = 0$

$a^2 b^2 = b^2 x^2$



$y = \frac{1}{x}$

$y = kx \pm \sqrt{b^2 + a^2 k^2}$

$y = \frac{1}{x} - \frac{1}{z} \qquad \frac{1}{x^2} - \frac{2}{xz} + \frac{1}{z^2} + 2\left(-\frac{1}{x^2} + \frac{z'}{z^2}\right) = 0$

$y' + ay^2 = bx^n$

$\frac{n}{n+2} = 2, 4, 6, 8, \ldots$

$\frac{1}{n} = -\frac{1}{4}, -\frac{3}{8}, -\frac{5}{12}, -\frac{7}{16}, \ldots \qquad y' + ay^2 = b$

$z' - \frac{z}{x} + \frac{1}{2} = 0 \qquad z' = \frac{z}{x} \qquad z = \frac{1}{y_1}$

$\frac{dz}{dx_1} \cdot \frac{1}{\mu x_1^{\mu - 1}} + \mu a z^2 x_1^{-2\mu - 1} = \mu b x_1^{(n+3)\mu - 1}$

$n = -4, -\frac{8}{3}, -\frac{12}{5}, -\frac{16}{7}, \ldots$

$z = ax$

$-\frac{dy_1}{dx_1} \cdot \frac{1}{y_1^2} + \frac{\mu a}{y_1^2} x_1^{-\mu - 1} = \mu b x_1^{(n+3)\mu - 1}$

n

$n_1 = -\frac{n+4}{n+3}$

$a'x + \frac{1}{2} = 0 \qquad a' = -\frac{1}{2x} \qquad a = -\frac{1}{2}\ln x + \alpha$

$= \mu b x_1^{(n+3)\mu - 1} \cdot y_1^2$

$z = -\frac{x}{2}\ln x + \alpha x = \frac{x}{1 - xy}$

$n_2 = -\frac{n_1 + 4}{n_1 + 3} \qquad \cancel{y = \frac{1}{x}} \qquad \frac{1}{z} = \frac{1}{x} - y = \frac{1 - xy}{x}$

$\frac{1}{1 - xy} = \alpha - \frac{1}{2}\ln x \qquad \frac{dy_1}{dx_1} + \mu b x_1^{(n+3)\mu - 1} y_1^2 = \mu a x_1^{-\mu - 1}$

$\vdots$

$n_{i+1} = -\frac{n_i + 4}{n_i + 3}$

$\mu = \frac{1}{n+3} \qquad n_1 = -1 - \frac{1}{n+3} = -\frac{n+4}{n+3}$

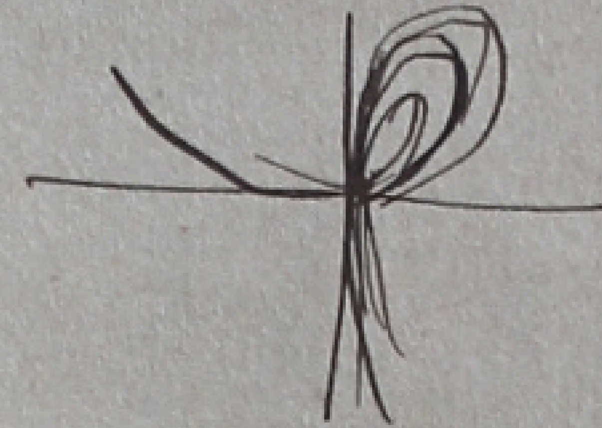
$2 + n_{i+1} = \frac{n_i + 2}{n_i + 3} \qquad \frac{1}{n_{i+1} + 2} = 1 + \frac{1}{n_i + 2}$

$= 2 + \frac{1}{n_{i-1} + 2} = \ldots = i + \frac{1}{n+2}$

$\frac{1}{n_i + 2} = i + \frac{1}{n+2}$

$\frac{1}{2} - \frac{1}{n+2} = i \ldots 2 = \frac{n}{2n+4}$

$x^3+y^3=3axy$



$x^2+y^2y'=a(y+xy')$

$$\frac{x^2+y^2y'}{y+xy'}=\frac{x^3+y^3}{3xy}$$

$$\cancel{3x^3y}+3xy^3y'=(\cancel{x^3}+y^3)y+(x^3-2y^3)xy'$$

$-2x^3$

$$(y^3-2x^3)y\,dx+(x^3-2y^3)x\,dy=0$$

$$(2x^3-y^3)y\,dx+(2y^3-x^3)x\,dy=0$$

$$\cancel{2xy(x^2dx+y^2dy)-(y^4dx+x^4dy)}$$

$$(1+t^3)t\,dx+(2t^3-1)(\cancel{t\,dx}+x\,dt)=0$$

$$(1+t^3)t\frac{dx}{x}+(2t^3-1)dt=0$$

$\log x=$

$$\log x=\int\frac{1-2t^3}{t(1+t^3)}dt$$

$t^3=\theta$

$$\log x=\frac{1}{3}\int\frac{1-2\theta}{\theta(1+\theta)}d\theta$$

$\cancel{\frac{1}{t}+\frac{1}{1+t^3}}$

$1+\theta-3\theta$

$$\int\frac{d\theta}{\theta}-3\int\frac{d\theta}{1+\theta}$$

$$\frac{1}{3}\log\theta-\log(1+\theta)$$

$$\frac{x}{a}=\frac{\theta^{\frac{1}{3}}}{1+\theta}$$

$x^3+y^3=axy$

$$\frac{x}{a}=\frac{t}{1+t^3}=\frac{xy}{x^3+y^3}$$