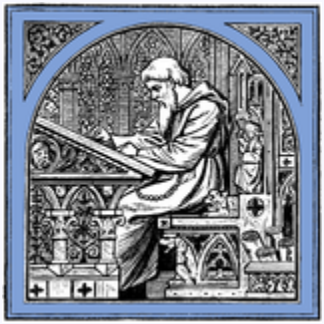
Leonhard Euler Letter 1765-03-31.pdf/5



Haec pagina nondum emendata est

En Theorema Analyticum continens Criterium, utrur? formula differentialis differentialia ??? gradus ??, sit? integrabilia rec ne! C?????que gradus f???it formula differentialis propo?it??, ea ponendo?

$\delta y = p\delta x; \delta p = q\delta x; \delta q = r\delta x;$: ch. sernper a han? fromam revocatur

$\gamma\delta x$in qua eist? γ quantitas ex litteris? x, y, p, q, r ch. ut? ungque con

flata, quoe? ergo mor? sotio differentiata pnebebit? takem formami

$$\delta\gamma = M\delta x + \int y\delta y? + P\delta p + Q\delta q + R\delta v\texttt{et}\,.$$

Jam dico quoties formula $\gamma\delta x$ integationem admiltit, totris?

fore? $? - \dfrac{\delta P}{\delta x} + \dfrac{\delta\delta Q}{\delta x^2} - \dfrac{\delta^3 R}{\delta x^3} + ch = 0$ a? viuis? seni?.

Exemplum. Sit proposita h??? forumla
$\dfrac{y\delta x\delta y.\, x\delta y^2 + xy\delta\delta y}{yy\delta x}$ s?mto \delta x consta???

q??e per positiones factas abit in $\frac{yp - zpp + xyq}{yy}\delta x$. ut sit

$$\gamma = \frac{p}{y} - \frac{xpp}{yy} + \frac{xq}{y}$$

hac quantitas differentietur, fuet que

$$M = -\frac{pp}{yy} + \frac{q}{y}; N = \frac{-p}{yy} - \frac{2xpp}{y^3}???; P = \frac{1}{y} - \frac{2xp}{yy}; Q = \frac{x}{y}; R = 0, S = 0?? - \frac{xq}{yy}$$

Hinc sit

$$\delta P = \frac{\delta y}{yy} - \frac{2p\delta x}{yy} - \frac{2x\delta p}{yy} + \frac{4?xp\delta y}{y^3} = \frac{-p\delta x}{yy} - \frac{2xq\delta x}{yy} - \frac{2xq\delta x}{yy} + \frac{4xpp\delta x}{y^3}$$

et $\frac{\delta P}{\delta x} = \frac{-3p}{yy} - \frac{2xq}{yy} + \frac{4xpp}{y**3}$

Pono

$$\delta Q = \frac{\delta x}{y} - \frac{x\delta y}{yy} = \frac{\delta x}{y} - \frac{xp\delta x}{yy} unde \frac{\delta Q}{\delta x} = \frac{1}{y} - \frac{xp}{yy}.$$

et ?enus differentiando

$$\frac{\delta\delta Q}{\delta x} = \frac{-\delta y}{yy} - \frac{p\delta x}{yy} - \frac{x\delta p}{yy} + \frac{2xp\delta y}{y^3} = \frac{-p\delta x}{yy} - \frac{p\delta x}{yy} - \frac{c?\delta x}{yy} + \frac{2xpp\delta x}{y^3}$$

ideoq $\frac{\delta\delta Q}{\delta x^2} = \frac{-2p}{yy} - \frac{xq}{yy} + \frac{zxpp}{y^3}$. Zuare habebit??

$N - \frac{\delta P}{\delta x} + \frac{\delta \delta Q}{\delta x^2} - ?? = \frac{-p}{yy} + \frac{2xpp}{y^3} + \frac{xq}{yy} = 0$. Ergo formula $\gamma \delta x$ eit integrabilis

$+\frac{3p}{yy} - \frac{4xpp}{y^3} + \frac{2xq}{yy}$ Manifesto autem integrale eit

$\frac{-2p}{yy} + \frac{2xpp}{y^3} - \frac{xq}{yy}$ \frac{x \delta y}{y \delta x}

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