$$F(\xi)=\int_{-\infty}^{\infty} f(x)\, e^{ix\xi}\, dx$$

$$f \mapsto \int_a^b K(x,y)\, f(x)\, dx = F(y)$$

jádro

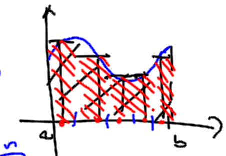
10 10-14:04

Riem. integrál: $a=x_0<x_1<\dots<x_n=b$

$x_0\le\xi_1\le x_1\le\dots$

$$S_\Xi=\sum_{i=1}^{n} f(\xi_i)(x_i-x_{i-1})$$

$$\frac{\partial F}{\partial y}(y_0)\approx\frac{F(y_0+h)-F(y_0)}{h}$$



$$F(y_0+h)\cong S_\Xi(y_0+h)=\sum_{i=1}^{n} f(\xi_i,y_0+h)(x_i-x_{i-1})$$

$$\frac{S_\Xi(y_0+h)-S_\Xi(y_0)}{h}$$

10 10-14:11

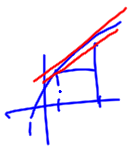
$$\sum_{i=1}^{n}\frac{f(\xi_i,y_0+h)-f(\xi_i,y_0)}{h}\cdot(x_i-x_{i-1})$$

$$f(\xi_i,y_0+h)-f(\xi_i,y_0)=h\,\frac{\partial f}{\partial y}(\xi_i,\eta_i)$$

$\eta_i\in\langle y_0,y_0+h\rangle$

$$\Rightarrow \sum_{i=1}^{n}\frac{\partial f}{\partial y}(\xi_i,\eta_i)(x_i-x_{i-1})$$

pro $h\to 0$



Pozn.: spojitá f na $[a,b]$ je stejnoměrně spojitá.

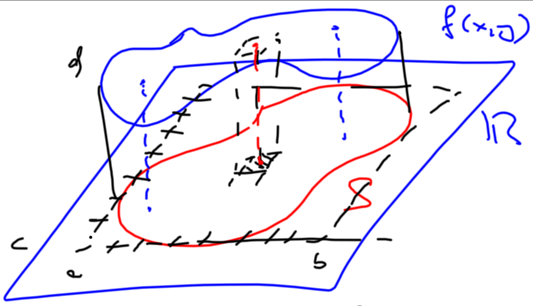
10 10-14:17

$\Rightarrow |y-y_0|<\delta$

$$\left|\frac{\partial f}{\partial y}(\xi_i,y)-\frac{\partial f}{\partial y}(\xi_i,y_0)\right|\le\varepsilon(\delta)$$

a $\varepsilon(\delta)\to 0$ pro $\delta\to 0$.

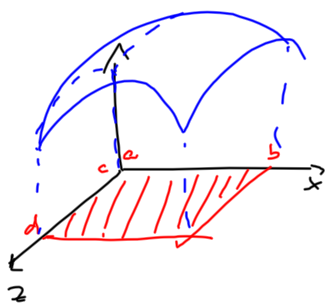
10 10-14:24



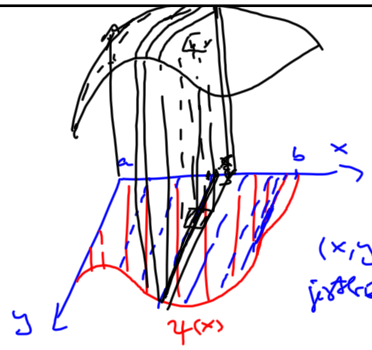
$[a,b]\times[c,d]\subset\mathbb{R}^2$

$$f(x,y)=\begin{cases} f(x,y) & [x,y]\in S\\ 0 & \text{jinak}\end{cases}$$

10 10-14:30



10 10-14:36



$(x,y) \in S$

jestliže $a \le x \le b$

$0 \le y \le \varphi(x)$

10 10-14:44

$$\int_{[0,1]\times[0,1]} x^3 y^2\,dx\,dy = \int_0^1\left(\int_0^1 x^3 y^2\,dx\right)dy = \int_0^1\left(\int_0^1 x^3 y^2\,dy\right)dx$$

$$\left[\frac14 x^4 y^2\right]_0^1 = \frac14 y^2$$

$$\frac14\int_0^1 y^2\,dy = \frac14\cdot\frac13\left(y^3\right)_0^1 = \frac1{12}$$

$$\left(\frac13 x^3 y^3\right)_0^1 = \frac13 x^3$$

$$\frac13\int_0^1 x^3\,dx = \frac1{12}$$

10 10-15:16

$x = x(t)$ $\qquad f(x)\,dx$

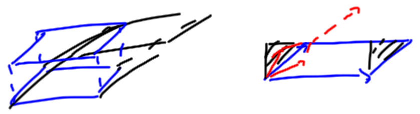
$dx = \frac{dx}{dt}\cdot dt$ $\qquad \frac{dx}{dt} = x'(t) > 0$

$$\boxed{\int_{x(t_0)}^{x(t_1)} f(x)\,dx = \int_{t_0}^{t_1} f(x(t))\,x'(t)\,dt}$$

více proměnných: $\boxed{dx_1 \dots dx_n}$ ≈ objem

$f(x_1,\dots,x_n)\,dx_1\dots dx_n$ ≈ příspěvek do integrálu

10 10-15:21



$$\boxed{\begin{aligned} x &= r\cdot\cos\varphi \\ y &= r\cdot\sin\varphi \end{aligned}}$$

$$D'G = \begin{pmatrix} \cos\varphi & -r\sin\varphi \\ \sin\varphi & r\cos\varphi \end{pmatrix}$$

$$\det D'G = r\cdot(\cos^2\varphi + \sin^2\varphi) = r$$

$= r$

10 10-15:32