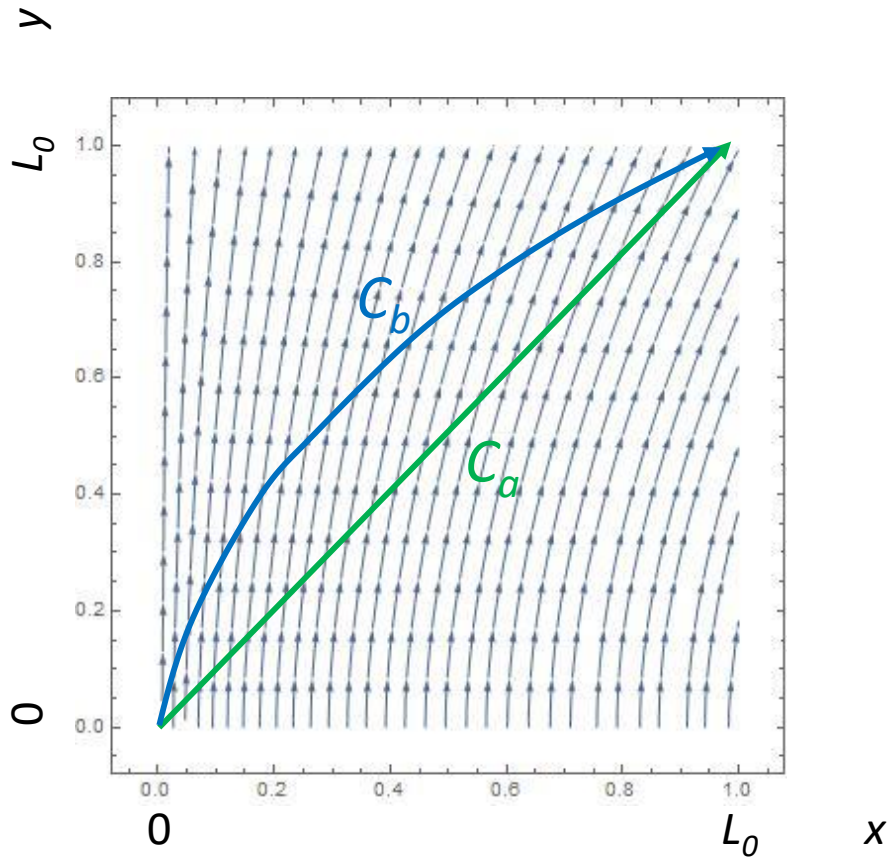
Integral po poti

$$\vec{F}(x,y)=\frac{F_0}{L_0^2}\left(xy, L_0(x+y)\right)$$

$a)\quad y=x$

$b)\quad y=\sqrt{L_0 x}$



$$A=\int_C \vec{F}(\vec{r})d\vec{r}$$

$$d\vec{r}=dx\hat{e}_x+dy\hat{e}_y$$

$$A_a=F_0L_0\frac{4}{3};\quad A_b=F_0L_0\frac{37}{30}$$

$A_b < A_a$

$s_b > s_a$

$$dA=\vec{F}(\vec{r})d\vec{r}=Fdr\cos\vartheta$$

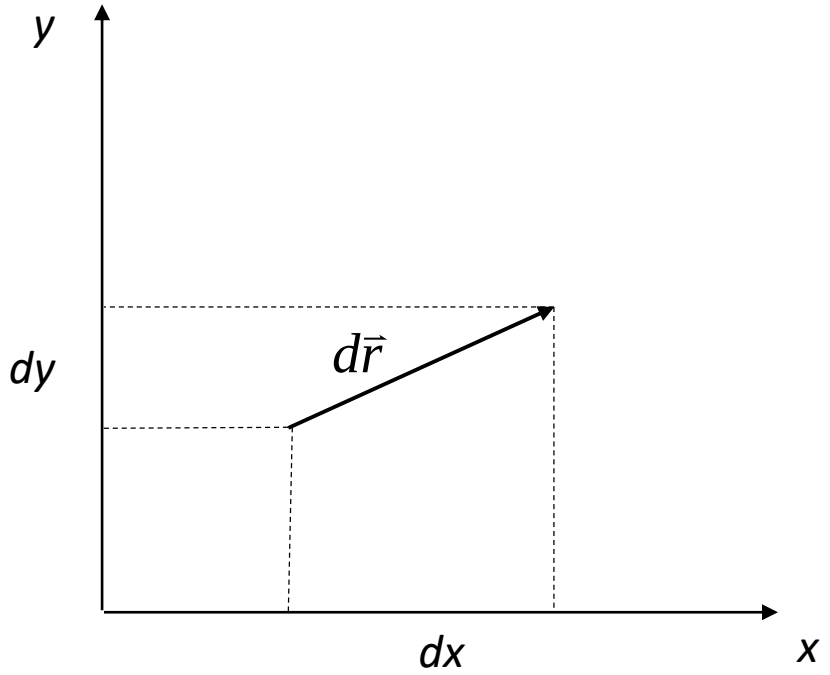
Dolžina poti

$$d\vec{r} = (dx, dy)$$

$$\left|d\vec{r}\right| = dr = \sqrt{(dx)^2 + (dy)^2} = dx\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$$

$$s = \int_C dr$$

$$s_a = \sqrt{2}L_0 = 1{,}41L_0 \qquad s_b = 1{,}48\,L_0$$



Povprečje

diskretne vrednosti:

$$y_i, \quad i = 1,\ldots, N$$

$$\langle y \rangle = \bar{y} = \frac{y_1 + y_2 + \ldots y_N}{N} = \frac{1}{N}\sum_{i=1}^{N} y_i$$

zvezne vrednosti:

$$y = f(x)$$

$$\langle y \rangle = \frac{1}{Z}\int_Z f(x)dz$$

Povprečje

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zvezne vrednosti:

$$y = f(x)$$

$$\langle y \rangle = \frac{1}{Z}\int_Z f(x)\, d\mathcal{z}$$

(enodim.) interval (čas, dimenzija,…), krivulja, površina, prostornina….;
od tega odvisen $d\mathcal{z}$

Povprečje

diskretne vrednosti:

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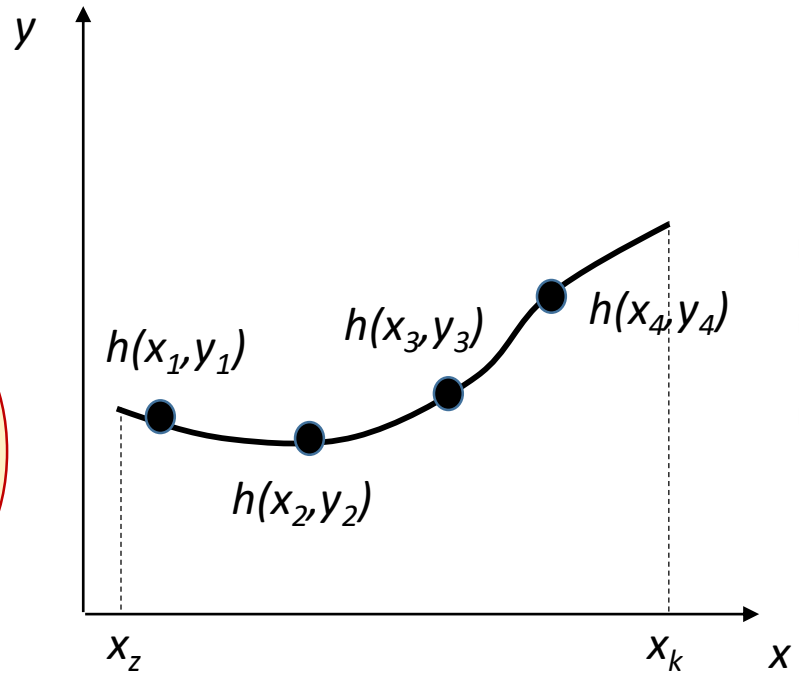

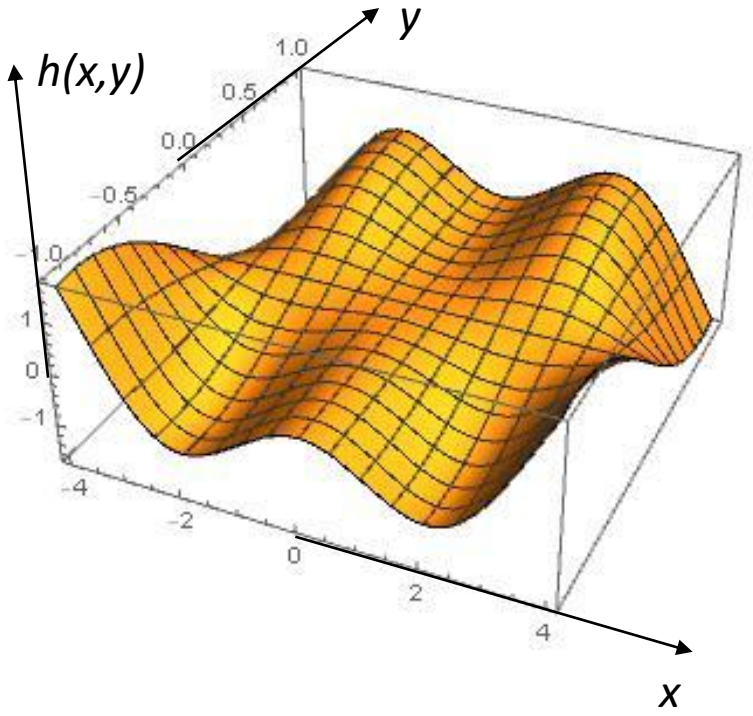

$$\langle h(\vec{r}) \rangle = \int_C h(\vec{r})\, dr$$

Povprečje

diskretne vrednosti:

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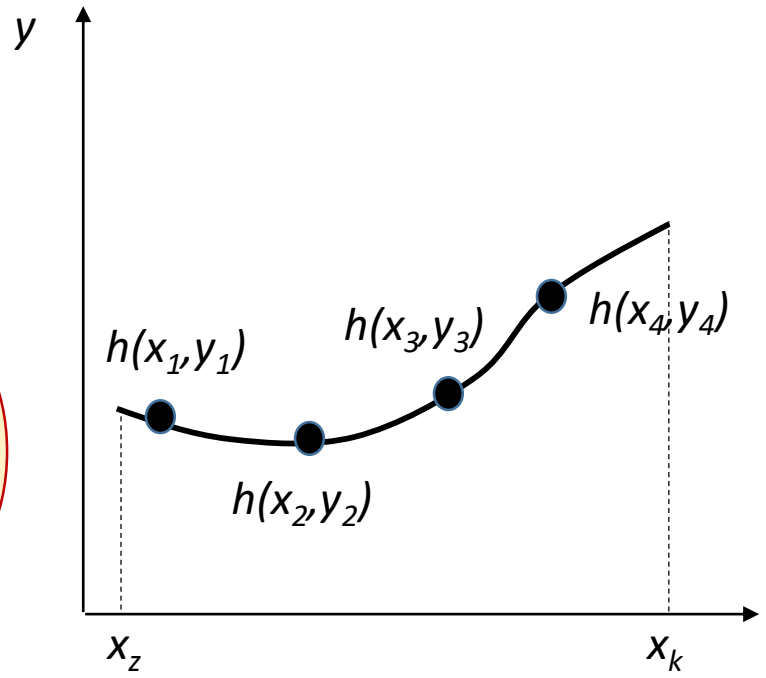
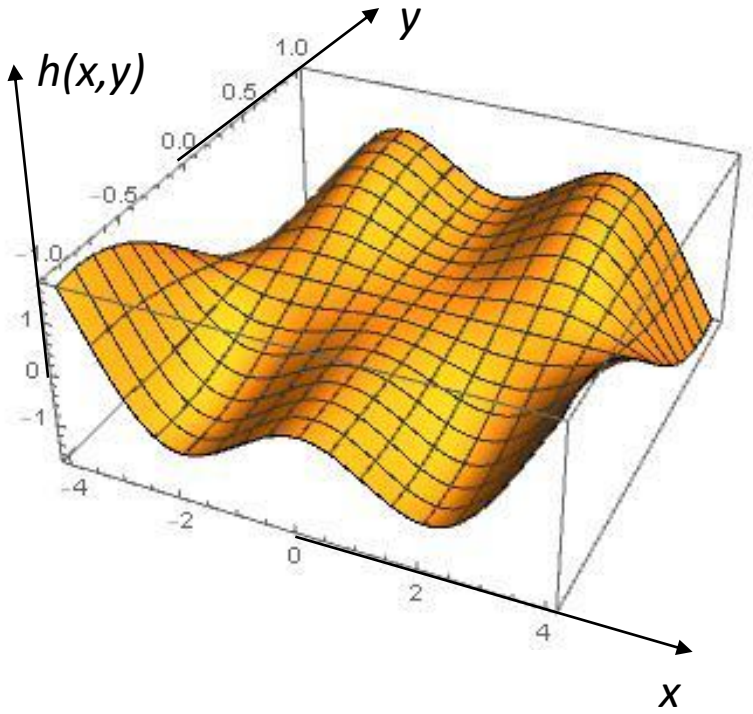




$$\langle h(\vec{r}) \rangle = \int_C h(\vec{r})\, dr$$

$$C : y = f(x)$$

$$\langle h(\vec{r}) \rangle = \int_{x_z}^{x_k} h(x,y)\sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$$

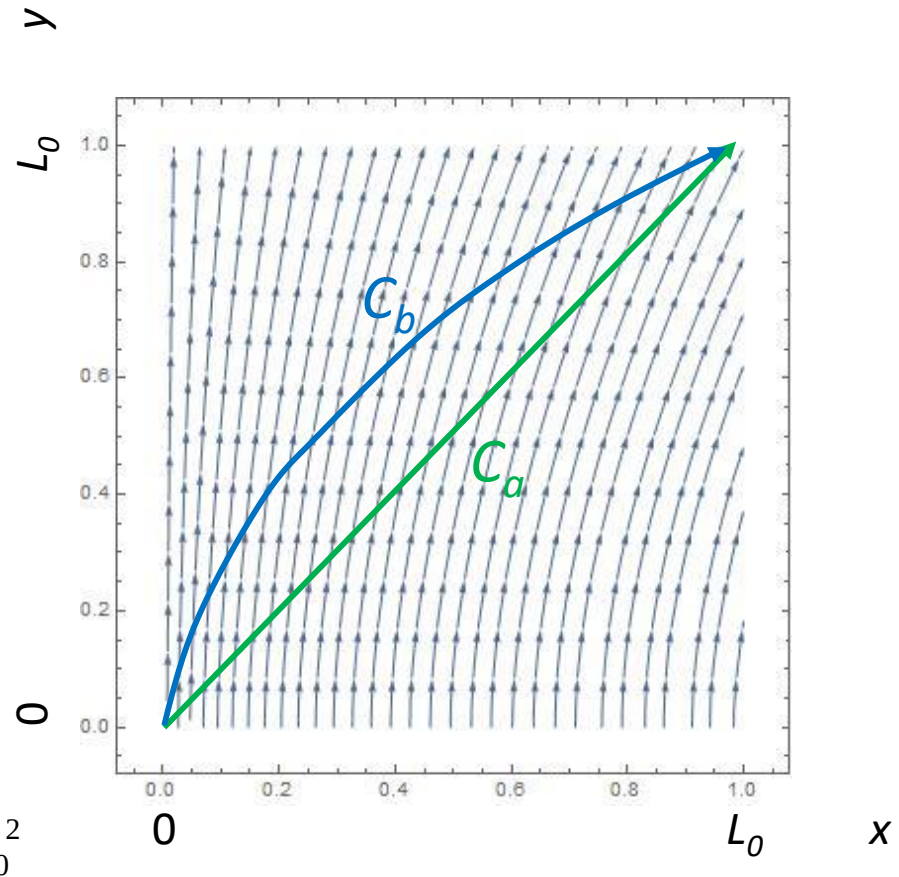
Povprečje

povprečna sila (kvadrat sile):

$$\left\langle F^2 \right\rangle = \underbrace{\frac{1}{s}}_{1/C} \int_C \underbrace{\frac{F_0^2}{L_0^4}\left(x^2y^2 + L_0^2(x+y)^2\right)}_{F^2(x,y)} \underbrace{\sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx}_{dr}$$

$$\left\langle F^2 \right\rangle_a = \frac{1}{\sqrt{2}L_0}\frac{F_0^2}{L_0^4}\int_0^{L_0}\left(x^4 + 4L_0^2x^2\right)\sqrt{2}dx = \frac{23}{15}F_0^2 = 1{,}53F_0^2$$

$$\left\langle F^2 \right\rangle_b = \frac{1}{1{,}48L_0}\frac{F_0^2}{L_0^4}\int_0^{L_0}\left(L_0x^3 + L_0^2(x+\sqrt{L_0x})^2\right)\sqrt{1+\frac{L_0}{4x}}dx = 1{,}51F_0^2$$



$$\left\langle \cos\vartheta \right\rangle_a = 0{,}85$$

$$\left\langle \cos\vartheta \right\rangle_b = 0{,}83$$