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About the surface and its surface

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Abstract
This is it topic during curve line , his equations , curves of the line length , to length have didn't happen curve line about data is brought .

Key words . Surfaces, surfaces and to the surface have was forms in khaki

In the plain curve line this

$$\begin{cases} x = x(t), \\ y = y(t) \end{cases} \quad (\alpha \le t \le \beta)$$

equations system with (in particular , $y = f(x), (a \le x \le b)$ equation with) to be determined we saw Ravshanki , crooked line $x(t), y(t)$ to functions depend _ If $x(t), y(t)$ functions $[\alpha, \beta]$ continuous at $x'(t),\ y'(t)$ to derivatives have if so , him smooth curve line it was called

Curved lines in theory important from concepts one curve of the line length is a curve to the line drawn broken line of fairy meter limit as defined and his length the following

$$l = \int_{\alpha}^{\beta} \sqrt{x'^2(t) + y'^2(t)}\,dt$$

with the formula expression in lectures statement done _

In the plain curve line to the concept similar in space surface concept when entered , his to himself special sides there is

In space simple surfaces - sphere, cylinder and that's it similar surfaces and their face _ _ count formulas to the student known .

We below common in appearance surfaces , their face , face to find formulas for the course need to be in volume briefly statement we will

1 ^{0} . Surface concept . let's say UOV in the plain Δ in the collection

$$x = x(u, v),\ y = y(u, v),\ z = z(u, v) \qquad (1)$$

functions given are , and they are Δ also continuous let it be $(u_0, v_0) \in \Delta$ point take , above functions at this point values we find :

$$x_0 = x(u_0, v_0),\ y_0 = y(u_0, v_0),\ z_0 = z(u_0, v_0).$$

Harvest has been (x_0, y_0, z_0) the R^3 in space M_0 of the point coordi natas that let 's see : $M_0 = M(x_0, y_0, z_0)$ Ravshanki , (u, v) point Δ in the collection when it changes (x, y, z) s R^3 in space something S the collection harvest does _ So , (1) relation Δ the collection S to the collection continuously reflection that to look can _

If (1) reflection mutually one valuable reflection if , that is Δ of the collection different $(u,v), (\bar{u}, \bar{v})$ points S of the collection different $(x, y, z), (\bar{x}, \bar{y}, \bar{z})$ to the points reflects _ S the collection R^3 in space surface that to look can _ Usually , it is surfaces simple surfaces is called

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Because of this

$$\begin{cases} x = x(u,v), \\ y = y(u,v), \qquad ((u,v) \in \Delta) \\ z = z(u,v) \end{cases} \qquad (2)$$

equations system of the surface parametric equation he says , in this u and v s parameters .
Specifically ($u = x, v = y$ when) this

$$\begin{cases} x = x, \\ y = y, \\ z = f(x,y) \end{cases}$$

equations system which determines surface

$$z = f(x,y) \qquad (3)$$

equation with is expressed .

D_k collection T_k of orthogonal projection that it was for

$$\mu D_k = \mu T_k \cdot |\cos\gamma_k|$$

b dies in this _ γ_k - S to the surface (ξ_k, η_k, z_k) $(z_k = f(\xi_k, \eta_k))$ nu q tada o ' tka zil gan don't try plain normal OZ bullet i with organize reached corner _
Ravshanki , $\lambda_{P_D} \to 0$ da $\lambda_{P_S} \to 0$ will be
If $\lambda_{P_D} \to 0$ at the following

$$\sum_{k=1}^{n} \mu T_k$$

now _ _ finite to the limit have if _ _ S surface surface have is called the value of the limit while S of the surface face is called So ,

$$\mu S = \lim_{\lambda_{P_D} \to 0} \sum_{k=1}^{n} \mu T_k \ .$$

It is known that

$$\cos\gamma_k = \frac{1}{\sqrt{1 + f_x'^2(\xi_k, \eta_k) + f_y'^2(\xi_k, \eta_k)}}$$

being _

$$\mu T_k = \frac{1}{\cos\gamma_k} \cdot \mu D_k$$

from equality while

$$\sum_{k=1}^{n} \mu T_k = \sum_{k=1}^{n} \sqrt{1 + f_x'^2(\xi_k, \eta_k) + f_y'^2(\xi_k, \eta_k)} \cdot \mu D_k$$

b 's death come What is it ?
Next right of equality on the side now _ _

$$\sqrt{1 + f_x'^2(x,y) + f_y'^2(x,y)}$$

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of the function integral sum will be This function D in the collection continuous , therefore integrable .
So ,

$$\lim_{\lambda_{P_D}\to 0}\sum_{k=1}^{n}\sqrt{1+f_x'^2(\xi_k,\eta_k)+f_y'^2(\xi_k,\eta_k)}\cdot\mu D_k =$$

$$=\iint_D\sqrt{1+f_x'^2(x,y)+f_y'^2(x,y)}dxdy.$$

So by doing S of the surface face

$$\mu S == \iint_D\sqrt{1+f_x'^2(x,y)+f_y'^2(x,y)}dxdy \qquad (4)$$

will be

Exercises

1. This $x^2+y^2+z^2=R$ from the sphere the following $x^2+y^2=r^2(r<R)$ of the cylinder cut received part of face be found
2. This $z=\frac{x^2}{2a}+\frac{y^2}{2b}$ elliptical of a paraboloid the following $\frac{x^2}{a^2}+\frac{y^2}{b^2}=c^2$ inside the cylinder is located part of face be found

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