Lista de Fórmulas para el Tercer Examen Parcial de Matemáticas para Ingeniería III

Integrales de Línea

$$\int_C f(x,y,z)\,ds$$

$$C: x=g(t),\ y=h(t),\ z=l(t)$$

$$ds=\sqrt{\left(\frac{\partial x}{\partial t}\right)^2+\left(\frac{\partial y}{\partial t}\right)^2+\left(\frac{\partial z}{\partial t}\right)^2}\,dt$$

$$\int_C \vec{F}\cdot d\vec{r}=\int_C Pdx+Qdy+Rdz$$

Campos Conservativos

Si: $\vec{F}=\nabla f$; $\vec{F}=\langle P,Q\rangle$; $\frac{\partial P}{\partial y}=\frac{\partial Q}{\partial x}$

O si $\vec{F}=\langle P,Q,R\rangle$; $rot\,F=\nabla\times\vec{F}=0$

$$W=\int_C \vec{F}\cdot d\vec{r}=f(x,y,z)-f(x,y,z)$$

$$f=\int Pdx\,;\ f=\int Qdy\,;\ f=\int Rdz$$

$$div\,\vec{F}=\nabla\cdot\vec{F}=\frac{\partial P}{\partial x}+\frac{\partial Q}{\partial y}+\frac{\partial R}{\partial z}$$

$$rot\,\vec{F}=\nabla\times\vec{F}=\begin{vmatrix} i & j & k\\ \partial/\partial x & \partial/\partial y & \partial/\partial z\\ P & Q & R\end{vmatrix}$$

Teorema de Green

$$\oint_C (Pdx+Qdy)=\iint_R\left(\frac{\partial Q}{\partial x}-\frac{\partial P}{\partial y}\right)dA$$

Área de una superficie

si:

$$\vec{r}(u,v)=\langle x(u,v),y(u,v),z(u,v)\rangle$$

Entonces:

$$A=\iint dS=\iint|\vec{r}_u\times\vec{r}_v|\,dA$$

Área de una superficie

si: $z=f(x,y)$

Entonces:

$$A=\iint dS=\iint\sqrt{1+\left(\frac{\partial z}{\partial x}\right)^2+\left(\frac{\partial z}{\partial y}\right)^2}\,dA$$

Integrales de Superficie

$$\iint_S f(x,y,z)\,dS \quad ; \quad si\ z=f(x,y)$$

$$dS=\sqrt{1+\left(\frac{\partial f}{\partial x}\right)^2+\left(\frac{\partial f}{\partial y}\right)^2}\,dA\,;$$

$$si\ r(u,v)=\langle x(u,v),y(u,v),z(u,v)\rangle$$

$$dS=|\vec{r}_u\times\vec{r}_v|\,dA$$

Integrales de Superficie

Si $S: r(u,v)$

$$\iint_S \vec{F}\cdot d\vec{S}=\iint_R \vec{F}\cdot(\vec{r}_u\times\vec{r}_v)\,dA$$

Si $z=f(x,y)$

$$\iint_S \vec{F}\cdot d\vec{S}=\iint_R\langle P,Q,R\rangle\cdot\left\langle-\frac{\partial f}{\partial x},-\frac{\partial f}{\partial y},1\right\rangle dA$$

Curva en el espacio: $\vec{r}(x,y,z)=\langle x(t),y(t),z(t)\rangle$

Esfera: $(x-h)^2+(y-k)^2+(z-l)^2=r^2$

Plano: $a(x-x_0)+b(y-y_0)+c(z-z_0)=0$

Paraboloide: $z=x^2+y^2$

Cono: $z^2=x^2+y^2$