Divergência e Rotacional

Vamos calcular o divergente e o rotacional usando o pacote linag.

> **with(linalg):**

Warning, new definition for norm

Warning, new definition for trace

Como exemplo calcule o divergente e o rotacional $< \sin x, \mathbf{e}^{(xyz)}, x + \sin z >$.

> **F := vector([sin(x),exp(x*y*z),x+sin(z)]);**

$$F := [\, \sin(x),\, \mathbf{e}^{(xyz)},\, x + \sin(z)\,]$$

> **divF := diverge(F,[x,y,z]);**

$$divF := \cos(x) + x\,z\,\mathbf{e}^{(xyz)} + \cos(z)$$

> **curlF := curl(F,[x,y,z]);**

$$curlF := [-x\,y\,\mathbf{e}^{(xyz)},\, -1,\, y\,z\,\mathbf{e}^{(xyz)}]$$

No ponto ($0, 1, \pi$), usamos os comandos **subs** e **eval** .

> **ValuedivF := subs(x=0,y=1,z=Pi,divF);**

$$ValuedivF := \cos(0) + \cos(\pi)$$

> **ValuedivF := simplify(ValuedivF);**

$$ValuedivF := 0$$

> **ValuecurlF := subs(x=0,y=1,z=Pi,eval(curlF));**

$$ValuecurlF := [0, -1, \pi\, e^0]$$

> **ValuecurlF := map(simplify,ValuecurlF);**

$$ValuecurlF := [0, -1, \pi]$$

>

Exercicio

Calcule o divergente e o rotacional do campo $\mathbf{F}$ (x, y, z) $= < x^2 \sin(yz), y^2 - xz, 2x^2 z\, e^{(z^2)}$

>.