versione 0

Equazioni differenziali – 0

In[19]:=
```
DSolve[{2 y''[x] + y'[x] == 8 + 6 e^(2 x), y[0] == 1, y'[0] == 10},
 y[x], x]
```

Out[19]= $\left\{\left\{y[x] \to \frac{1}{5} e^{-x/2} \left(-8 + 10 e^{x/2} + 3 e^{5x/2} + 40 e^{x/2} x\right)\right\}\right\}$

Funzioni di due variabili, punti critici – 0

In[30]:=
```
g[x_, y_] := x^2 * Log[x + y^2];
f[x_, y_] := g[x, y]; Expand[f[x, y]];
Print[f[x, y]];
grad = Expand[{D[f[x, y], x], D[f[x, y], y]}];
Print[grad];
Print[Solve[grad == {0, 0}, {x, y}]];
H[x_, y_] = ( ∂x,x f[x, y]  ∂x,y f[x, y]
              ∂y,x f[x, y]  ∂y,y f[x, y] );
Print[Simplify[MatrixForm[H[x, y]]]]
```

$x^2 \text{Log}[x + y^2]$

$\left\{\frac{x^2}{x + y^2} + 2 x \text{Log}[x + y^2], \frac{2 x^2 y}{x + y^2}\right\}$

Solve::dinv :

The expression $(x + y^2)^{1+\frac{y^2}{x}}$ involves unknowns in more than one argument, so inverse functions cannot be used. ≫

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$\text{Solve}\left[\left\{\frac{x^2}{x + y^2} + 2 x \text{Log}[x + y^2], \frac{2 x^2 y}{x + y^2}\right\} == \{0, 0\}, \{x, y\}\right]$

$$\begin{pmatrix} \frac{x(3x+4y^2)}{(x+y^2)^2} + 2 \text{Log}[x + y^2] & \frac{2xy(x+2y^2)}{(x+y^2)^2} \\ \frac{2xy(x+2y^2)}{(x+y^2)^2} & \frac{2x^2(x-y^2)}{(x+y^2)^2} \end{pmatrix}$$

In[44]:= `MatrixForm[H[e^(-1/2), 0]]`

Out[44]//MatrixForm=

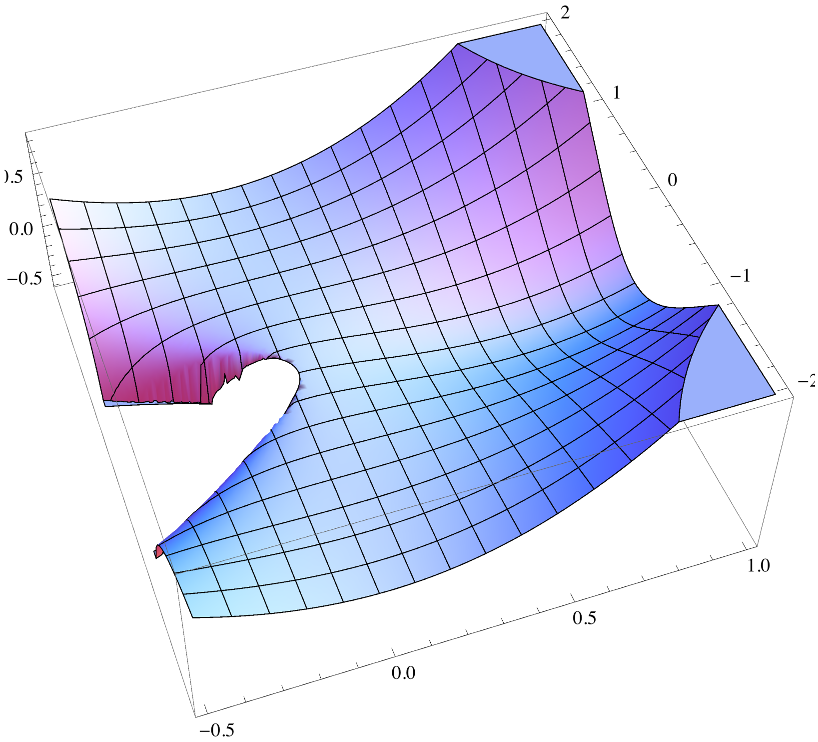
$$\begin{pmatrix} 2 & 0 \\ 0 & \frac{2}{\sqrt{e}} \end{pmatrix}$$

`MatrixForm[H[0, y]]`

$$\begin{pmatrix} 2 e^{y^2} & 0 \\ 0 & 0 \end{pmatrix}$$

In[46]:= `Plot3D[f[x, y], {x, -.5, 1}, {y, -2, 2}, PlotPoints → 50]`

Out[46]=



Integrale doppio – 0

In[49]:= $f[x\_, y\_] := \dfrac{6 x^2}{y^2 - 16 y + 65}$

$\text{Assuming}\left[y > 0, \text{Simplify}\left[\left\{\int_{\sqrt[3]{y}}^{2} f[x, y]\, dx, \int_0^8 \int_{\sqrt[3]{y}}^{2} f[x, y]\, dx\, dy\right\}\right]\right]$

Out[50]= $\left\{-\dfrac{2\,(-8 + y)}{65 - 16\,y + y^2}, \text{Log}[65]\right\}$

In[52]:= $\text{Simplify}\left[\left\{\int_0^{x^3} f[x, y]\, dy, \int_0^2 \int_0^{x^3} f[x, y]\, dy\, dx\right\}\right]$

Out[52]= $\left\{6\,x^2\,\left(\text{ArcTan}[8] - \text{ArcTan}\left[8 - x^3\right]\right), \text{Log}[65]\right\}$

Numeri complessi – 0

In[53]:= $\text{Solve}\left[z^2 - 2 z + 4 == 0, z\right]$

Out[53]= $\left\{\left\{z \to 1 - i\sqrt{3}\right\}, \left\{z \to 1 + i\sqrt{3}\right\}\right\}$

Autovalori, autovettori – 0

In[54]:= $a = \begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$; Eigenvalues[a]

Out[54]= {1, 0}

In[55]:=
```
Eigenvectors[a]
```

Out[55]= {{1, 1}, {-1, 1}}

In[56]:= $p = \frac{1}{\sqrt{2}}$ {{1, 1}, {-1, 1}}; MatrixForm[p]

Out[56]//MatrixForm=

$$\begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{pmatrix}$$

In[58]:=
```
MatrixForm[p.a.Transpose[p]]
```

Out[58]//MatrixForm=

$$\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$$