versione 0

Equazioni differenziali – 0

```
Expand[DSolve[{y'[x] == 3 Tan[x] * y[x] + 8 Sin[x], y[π] == 3},
  y[x], x]]
```

$\{\{y[x] \to -2\,\mathrm{Cos}[x] - \mathrm{Sec}[x]^3\}\}$

Funzioni di due variabili, punti critici – 0

```
g[x_, y_] := x^2 * e^(-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]]]]
```

$e^{-x+y^2}\, x^2$

$\{2\, e^{-x+y^2}\, x - e^{-x+y^2}\, x^2,\ 2\, e^{-x+y^2}\, x^2\, y\}$

$\{\{x \to 2,\ y \to 0\},\ \{x \to 0\}\}$

$$\begin{pmatrix} e^{-x+y^2}\,(2 - 4x + x^2) & -2\, e^{-x+y^2}\,(-2+x)\, x\, y \\ -2\, e^{-x+y^2}\,(-2+x)\, x\, y & 2\, e^{-x+y^2}\, x^2\,(1+2y^2) \end{pmatrix}$$

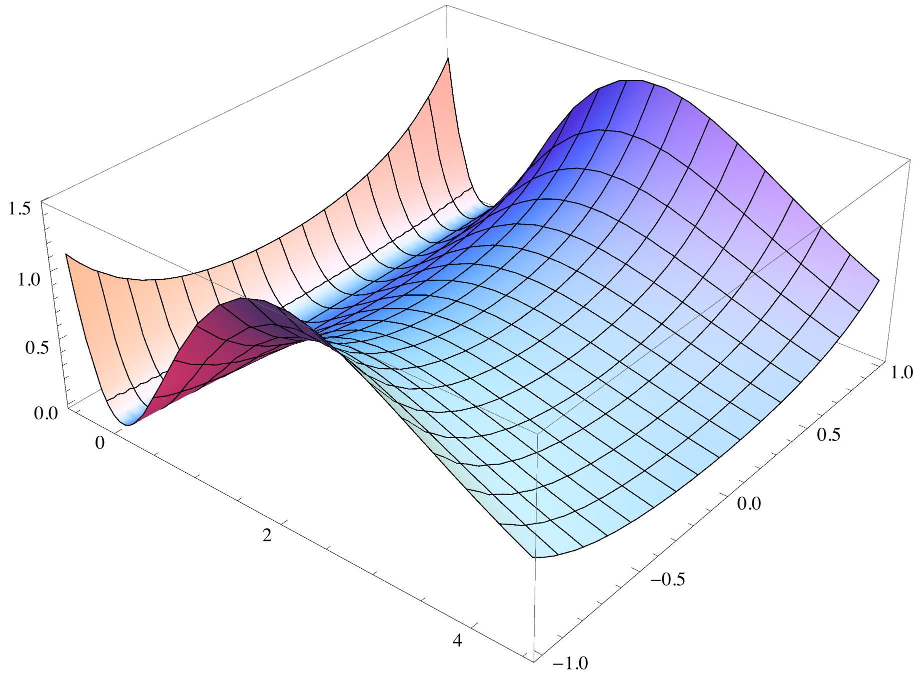
```
MatrixForm[H[2, 0]]
```

$$\begin{pmatrix} -\frac{2}{e^2} & 0 \\ 0 & \frac{8}{e^2} \end{pmatrix}$$

```
MatrixForm[H[0, y]]
```

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

```
Plot3D[f[x, y], {x, -.5, 4.5}, {y, -1, 1}, PlotPoints → 20]
```



Integrale doppio – 0

$$f[x\_, y\_] := \frac{1}{x};$$

$$\text{Assuming}\left[y > 0, \text{Simplify}\left[\left\{\int_1^{\frac{2}{y}} f[x, y]\, dx, \int_1^2 \int_1^{\frac{2}{y}} f[x, y]\, dx\, dy\right\}\right]\right]$$

$$\left\{\text{Log}\left[\frac{2}{y}\right], 1 - \text{Log}[2]\right\}$$

$$\text{Assuming}\left[y > 0, \text{Simplify}\left[\left\{\int_1^{\frac{2}{x}} f[x, y]\, dy, \int_1^2 \int_1^{\frac{2}{x}} f[x, y]\, dy\, dx\right\}\right]\right]$$

$$\left\{\frac{2 - x}{x^2}, 1 - \text{Log}[2]\right\}$$

Numeri complessi – 0

z^3

=

27 ⅈ

svolgimento

w=

27 ⅈ

|w| =

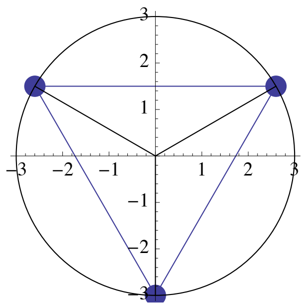
27

Un argomento di w è

$\frac{\pi}{2}$

le soluzioni sono

$\left\{3\left(\frac{i}{2}+\frac{\sqrt{3}}{2}\right),\ 3\left(\frac{i}{2}-\frac{\sqrt{3}}{2}\right),\ -3\,i\right\}$



Matrici – 0

```
Clear[k]; A = {{1 - k, 0, 0}, {-1, 2, -1}, {-k, 2, 2}}; x = {{3}, {1}, {2}}; MatrixForm[A.x]
```

$\begin{pmatrix} 3\,(1-k) \\ -3 \\ 6-3\,k \end{pmatrix}$

```
Solve[A.x == -3 x, k]
```

{{k → 4}}

```
k = 4; Print[MatrixForm[A]]
```

$\begin{pmatrix} -3 & 0 & 0 \\ -1 & 2 & -1 \\ -4 & 2 & 2 \end{pmatrix}$

```
Eigenvalues[A]
```

$\left\{-3,\ 2+i\sqrt{2},\ 2-i\sqrt{2}\right\}$

versione 1

Equazioni differenziali – 1

```
Expand[DSolve[{y'[x] == 4 Tan[x] * y[x] + 10 Sin[x], y[π] == 3},
  y[x], x]]
```

$\{\{y[x] \to -2\,Cos[x] + Sec[x]^4\}\}$

Funzioni di due variabili, punti critici – 1

```
g[x_, y_] := x^2 * e^(-x+y^2);
f[x_, y_] := g[y, x]; 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]]]]
```

$e^{x^2-y}\, y^2$

$\{2\, e^{x^2-y}\, x\, y^2,\ 2\, e^{x^2-y}\, y - e^{x^2-y}\, y^2\}$

$\{\{y \to 2,\ x \to 0\},\ \{y \to 0\}\}$

$$\begin{pmatrix} 2\, e^{x^2-y}\left(1+2x^2\right) y^2 & -2\, e^{x^2-y}\, x\,(-2+y)\, y \\ -2\, e^{x^2-y}\, x\,(-2+y)\, y & e^{x^2-y}\left(2-4y+y^2\right) \end{pmatrix}$$

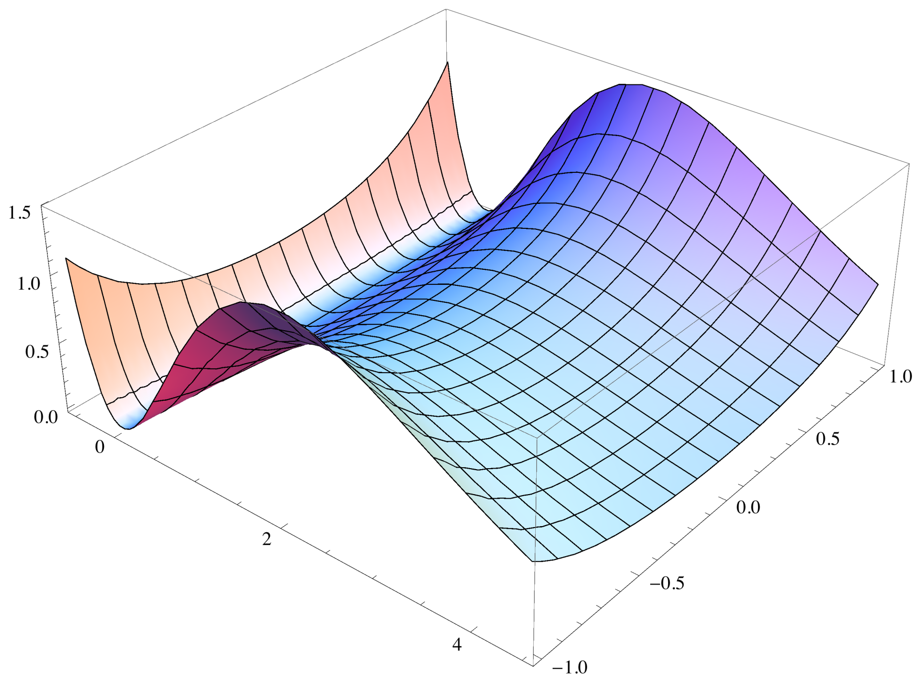
```
MatrixForm[H[0, 2]]
```

$$\begin{pmatrix} \frac{8}{e^2} & 0 \\ 0 & -\frac{2}{e^2} \end{pmatrix}$$

```
MatrixForm[H[x, 0]]
```

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

```
Plot3D[f[x, y], {y, -.5, 4.5}, {x, -1, 1}, PlotPoints → 20]
```



Integrale doppio – 1

```
f[x_, y_] := 2/y;
```

```
Assuming[y > 0, Simplify[{∫_1^(2/y) f[x, y] dx,
    ∫_1^2 ∫_1^(2/y) f[x, y] dx dy}]]
```

$$\left\{\frac{4-2y}{y^2},\ 2-\text{Log}[4]\right\}$$

```
Assuming[x > 0, Simplify[{∫_1^(2/x) f[x, y] dy,
    ∫_1^2 ∫_1^(2/x) f[x, y] dy dx}]]
```

$$\left\{2\,\text{Log}\left[\frac{2}{x}\right],\ 2-\text{Log}[4]\right\}$$

Numeri complessi – 1

z^3

=

-8

svolgimento

w=

-8

|w|=

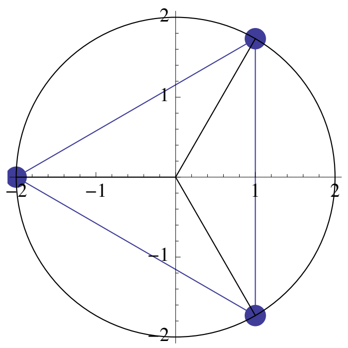
8

Un argomento di w è

π

le soluzioni sono

$$\left\{2\left(\frac{1}{2}+\frac{i\sqrt{3}}{2}\right),\ -2,\ 2\left(\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)\right\}$$



Matrici – 1

```
Clear[k]; A = (2-k  0   0 ); x = (3); MatrixForm[A.x]
              (-1   3  -1 )      (1)
              (-k   2   3 )      (2)
```

$$\begin{pmatrix} 3\,(2-k) \\ -2 \\ 8-3\,k \end{pmatrix}$$

```
Solve[A.x == -2 x, k]
```

{{k → 4}}

```
k = 4; Print[MatrixForm[A]]
```

$$\begin{pmatrix} -2 & 0 & 0 \\ -1 & 3 & -1 \\ -4 & 2 & 3 \end{pmatrix}$$

```
Eigenvalues[A]
```

$\left\{3+i\sqrt{2},\ 3-i\sqrt{2},\ -2\right\}$