

RIEŠENIE NIEKTORÝCH VÝPOČTOVÝCH ÚLOH V PROSTREDÍ MAXIMA

ÚLOHA

Vypočítajte v prostredí MAXIMA nasledovné typy úloh (príkladov);

a) $\lim_{x \rightarrow -\infty} \frac{7x^2 + 2}{2x^2 - x - 6}$

b) $\left(\sin x + \frac{1}{x} + 5x^2 - 4x \right)'$

c) $\int \ln x \, dx$

d) $\int_{-\infty}^0 e^{3x} \, dx$

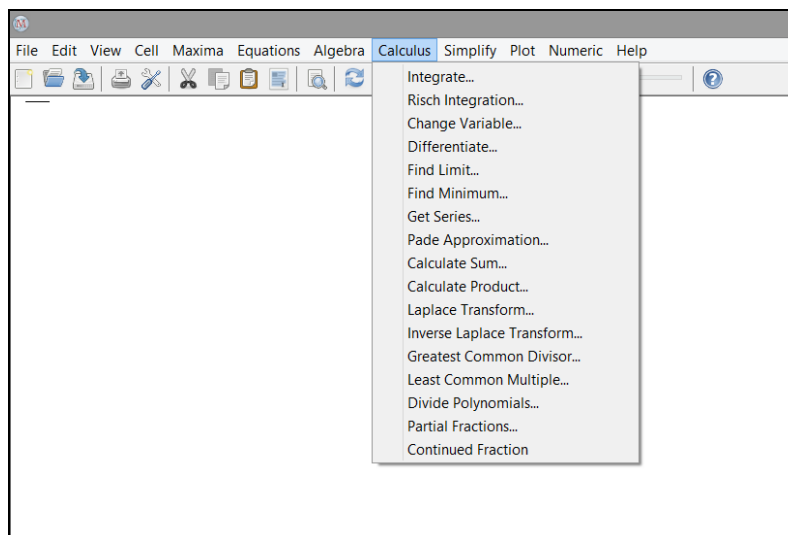
e) $\sum_{n=1}^{\infty} \left(\frac{1}{3} \right)^n$

f) $\mathbf{A}^{-1} = ?$, $\mathbf{A} = \begin{pmatrix} 1 & 0 & 2 \\ 2 & 1 & -1 \\ 1 & 1 & -2 \end{pmatrix}$, $h(\mathbf{A}) = 3$

INŠTALÁCIA

<https://sourceforge.net/projects/maxima/files/Maxima-Windows/5.37.3-Windows/maxima-clisp-5.37.3.exe/download>

PROSTREDIE



RIEŠENIE

a) $\lim_{x \rightarrow -\infty} \frac{7x^2 + 2}{2x^2 - x - 6}$

```
limit((7*x^2+2)/(2*x^2-x-6), x, -inf);
7
2
```

b) $\left(\sin x + \frac{1}{x} + 5x^2 - 4x \right)$

```
diff(sin(x) + (1/x) + 5*x^2 - 4*x, x, 1);
cos(x) + 10/x - 4
```

c) $\int \ln x \, dx$

Integrate dialog box configuration for $\int \ln x \, dx$:

- Expression: `log(x)`
- Variable: `x`
- Definite integration
- From: `0` (Special)
- To: `1` (Special)
- Numerical integration
- Method: `quadpack`

```
integrate(log(x), x);
x log(x) - x
```

d) $\int_{-\infty}^0 e^{3x} \, dx$

Integrate dialog box configuration for $\int_{-\infty}^0 e^{3x} \, dx$:

- Expression: `exp(3*x)`
- Variable: `x`
- Definite integration
- From: `-inf` (Special)
- To: `0` (Special)
- Numerical integration
- Method: `quadpack`

```
integrate(exp(3*x), x, -inf, 0);
1/3
```

$$e) \sum_{n=1}^{\infty} \left(\frac{1}{3}\right)^n$$

```
sum((1/3)^n, n, 1, inf), simpsum;
1/2
```

$$f) \mathbf{A}^{-1} = ?, \mathbf{A} = \begin{pmatrix} 1 & 0 & 2 \\ 2 & 1 & -1 \\ 1 & 1 & -2 \end{pmatrix}, h(\mathbf{A}) = 3$$

$$\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & -1 \\ 1 & 1 & -2 \end{bmatrix}$$

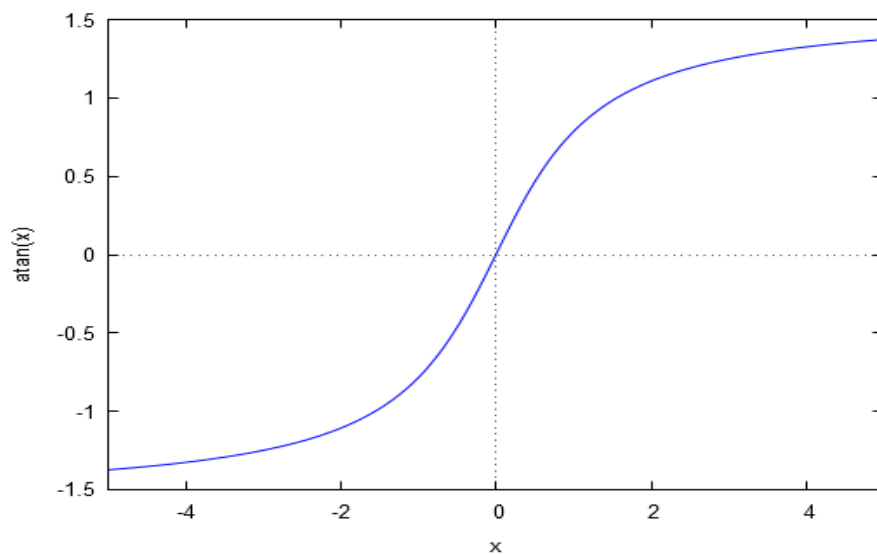
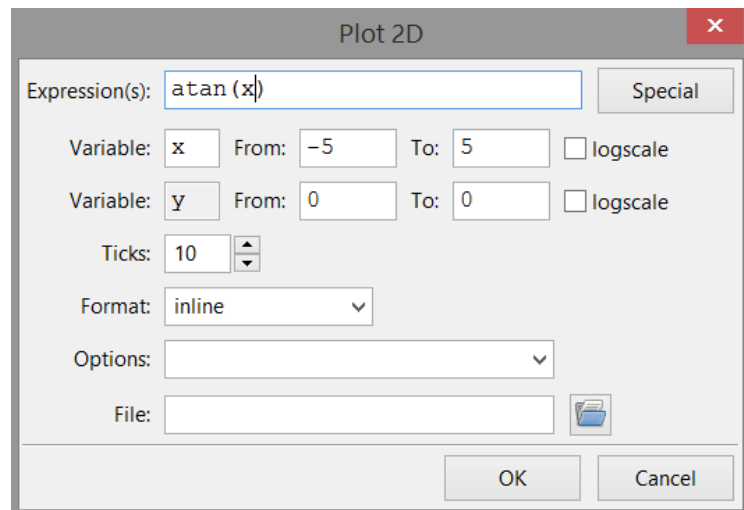
Zadanú maticu A vyznačíme myšou a zadáme príkaz Algebra/Invert Matrix. Následne dostávame inverznú maticu nižšie

$$\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & -1 \\ 1 & 1 & -2 \end{bmatrix}$$

```
invert(matrix([1,0,2],[2,1,-1],[1,1,-2]));
```

$$\begin{bmatrix} -1 & 2 & -2 \\ 3 & -4 & 5 \\ 1 & -1 & 1 \end{bmatrix}$$

Poznámka č. 1 Príklad práce s 2D grafmi, $y = \arctg x$



Poznámka č. 2 Příklad práce s 3D grafmi, $z = x^2 + y^2$ 