```
-----------------------------------------------
ClearAll["Global`*"];
-----------------------------------------------
$Post=N; (* default: not defined *)
Sin[1]
$Post=.
-----------------------------------------------
Plot[x^2 + 1/x, {x, -3, 3},
 Prolog -> {PointSize[0.3], Red  , Point[{ 2, 3}]},
 Epilog -> {PointSize[0.2], Green, Point[{-2, 3}]}]
-------------------------------------------------
Thread[{l1, l2} == {r1, r2}]
-----------------------------------------------
e1 = {l1, l2} == {r1, r2}
e2 = Thread[e1]
z1 = Apply[List, e2, {1}]
z2 = Transpose[z1]
e3 = Apply[Equal, z2]
-----------------------------------------------
Rule @@@ {{a,b},{c,d}}         {a -> b, c -> d}
-----------------------------------------------
f[x_] := Sum[a[n]*x^n, {n, 0, 4}]
f[z]
f[0]
q^0
0^0
g[x_] = Sum[a[n]*x^n, {n, 0, 4}]
a[0] + x a[1] + x^2 a[2] + x^3 a[3] + x^4 a[4]
g[0]
0^0 = 1
Unprotect[Power]
0^0 = 1
h[x_] := Sum[a[n]*x^n, {n, 0, 4}]
-----------------------------------------------
Jacobian as a funcion:
f[{x_,y_}]:={x^2+y^3,x^4-y^5};
j=Function[{x,y},Evaluate[D[f[{x,y}],{{x,y}}]]]@@#1&;
a = {2,3};
j[a];
-------------------------------------------------
Inner[Rule,{x0,y0},{7,8},List]        {x0 -> 7, y0 -> 8}
Inner[Equal,{x0,y0},{7,8},List]       {x0 == 7, y0 == 8}
Reduce[{a,b}=={8,9}]                  b == 9 && a == 8
Reduce[{{a,b},{c,d}}=={{6,7},{8,9}}]  d == 9 && c == 8 && b == 7 && a == 6
-----------------------------------------------
D[f,{x,2}]     -> fxx
D[f,{{x,y}}]   -> grad f
D[z,{{x,y},2}] -> Hessian
Jacobian: D[{x+y,x-y},{{x,y}}]
-------------------------------------------------
f[x_] := Sqrt[2] + x/Pi
NestList[f, 1/3, 5]
NestList[f, 1/3, 5.0]
NestList[f, 1/3.0, 5]
NestList[f, N[1/3, 40], 30] // TableForm
-------------------------------------------------
hadanka:
x=If[#1==1,1,#1#0[#1-1]]&;
-------------------------------------------------
Clear["Global`*"];
xm = 30;
y0 = 0.5;
rovnice = 4y''[x]+2(y'[x])^2+y[x]==0;
pocpodm = {y[0]==y0,y'[0]==0};
sol[y0_]:=NDSolve[{rovnice,pocpodm},y,{x,0,xm}];
Plot[Evaluate[y[t] /. sol[y0]], {t, 0, xm}]
ParametricPlot[Evaluate[{y[t], y'[t]} /. sol[y0] ], {t, 0, xm}]
-------------------------------------------------
Clear["Global`*"];
xm = 30;
rovnice = 4y''[x]+2(y'[x])^2+y[x]==0;
pocpodm = {y[0]==y0,y'[0]==0};
```

```
sol[y0_]:=NDSolve[{rovnice,pocpodm},y,{x,0,xm}];
Plot[Evaluate[Table[y[t] /. sol[y0], {y0, 0, 1, 0.1}]], {t, 0, xm}]
ParametricPlot[Evaluate[Table[{y[t], y'[t]} /. sol[y0], {y0, 0, 1, 0.1}]], {t, 0, xm}]
-------------------------------------------------
matrix with rational eigenvalues
n=3;
Table[
a=Table[Random[Integer,{1,9}],{n},{n}];
e=Eigenvalues[a];
If[Element[e,Rationals], Print[a,e]];
,{10000}];
-------------------------------------------------
Pythagorova veta s prirozenymi cisly 4.12.2010
 m = 99;
 r = {{3,4,5}};
 Print[r[[-1]]];
 Table[
  c = Sqrt[a^2+b^2];
  If[Round[c]==c,
   p = Product[Norm[Cross[{a,b,c},r[[i]]]],{i,Length[r]}];
   If[Round[c]==c && p!=0, AppendTo[r,{a,b,c}]; Print[r[[-1]]]; ];
  ];
 ,{a,1,m},{b,a+1,m}];
{3, 4, 5}
{5, 12, 13}
{7, 24, 25}
{8, 15, 17}
{9, 40, 41}
{11, 60, 61}
{12, 35, 37}
{13, 84, 85}
{16, 63, 65}
{20, 21, 29}
{20, 99, 101}
{28, 45, 53}
{33, 56, 65}
{36, 77, 85}
{39, 80, 89}
{48, 55, 73}
{60, 91, 109}
{65, 72, 97}
-------------------------------------------------
(* rational singular values 29.11.2011 *)
g[n_] := (q = {};
  Table[m = {{a, b}, {c, d}}; mm = Union[Flatten[m]];
   If[Element[SingularValueList[m], Rationals] && Det[m] != 0 &&
     Transpose[m] != m && ! MemberQ[q, mm], Print[m];
    AppendTo[q, mm];], {a, n}, {b, n}, {c, n}, {d, n}];)
{{2,2},{5,2}}
{{2,3},{6,2}}
{{2,4},{7,2}}
{{2,5},{8,2}}
{{2,6},{9,2}}
{{4,1},{7,4}}
{{4,3},{9,4}}
{{6,1},{6,6}}
{{6,2},{7,6}}
{{6,3},{8,6}}
-------------------------------------------------------------
```