# Mathematical Functions Interpreter

The following program implements simple interpreter which allows defining mathematical functions with multiple variables, their evaluating and finding their derivatives. Functions are defined using basic arithmetic operations and by composition of elementary functions $x$, $\sin(x)$, $\cos(x)$ and constant functions. For example, $\sin(cos(x) + x) * \cos(x) + 3.14$. Language commands are specified in separate lines.

- Defining function with multiple variables whose names are lowercases, while function names are uppercases, starts with the keyword **function**, followed by its name, list of arguments separated by , between (), = and its definition between "".

```
function F(x)="1+x*x"
function G(x,y)="sin(cos(x))+y+3.14"
function H(x,y,z)="2*x+3*y+4*z"
function J(x,y)="x+y+z"                    Incorrectly defined function
```

- The printing of the function is realized by stating its name.

```
F                                          (1)+((x)*(x))
G                                          ((sin(cos(x)))+(y))+(3.14)
H                                          (((2)*(x))+((3)*(y)))+((4)*(z))
```

- The evaluating of the function at a point is realized by operator [].

```
F[2]                                       5
H[1,2,3]                                   20
G[1,2,3]                                   Incorrect number of arguments
```

- The derivative of the function of some variable is calculated by operator ‘ followed by variable.

```
F'x          (0)+(((1)*(x))+((x)*(1)))
G'y          (((cos(cos(x)))*(((-1)*(sin(x)))*(0)))+(1))+(0)
H'z          ((((0)*(x))+((2)*(0)))+(((0)*(y))+((3)*(0))))+(((0)*(z))+((4)*(1)))
```