

```
=====
Units
=====
None
=====
```

\0

nnn

setup

solver

Helpp

bab

300

0.1

bbb

inp

left1

savve

right1

dummy4

dummy

dummy1

dummy2

mark

hiding

hiding2

view1

SAVE2

RETRIV2

DUMMY3

line1

\a

bAC

bAD

data

dataa

ERR1

TEST1

edit2

graf

MAIN

menu1

Arith

MEMO

func

unit1

unit2



stat

STAT1

NORMAL

integral1

integral

DIFF

diff1

Polynomial curvefit subroutine  
\*\*\*\*\*

ROOT FINDING ROUTINE

\*\*\*\*\*

INPUT3  
input2  
input1

flag1  
flag4  
FLAG8

ERRMSG

WARN

warn1

LINEAR

impedit

hiding3

Eedit

ddata

impedit1

impedit2

Sheet1

=====

|

=====

|

=====

{esc 5}{SIZE}{DISP}{PANELoff}{windowsoff}{LET DUMMY,@SECOND(@NOW)}~{windowson}{windowsoff}{let unit,"None"}~{

{err1}{ESC 5}{IF FLAG10=0}{windowsoff}{GOTO}L1~/FCCEFORMULAS.WK1~{LET FLAG10,1}~{TIM}  
{err1}{goto}et21~{WINDOWSON}{menucall main}{BRANCH NNN}

Fixed

Fixed number of decimal places (x.xx) [ESC] - Previous menu  
{esc 5}{err1}{getlabel "Enter number of decimal places (0..15) ",point1f}~/cpoint1f~point1ff~  
{window}~/wgff  
2  
~{window}~/wgff  
2  
~{menubranh setup}

Integration

Inegration of functions and data [ESC] - Previous menu  
{esc 5}{err1}{LET VAR,1}~{MENUCALL INTEGRAL1}  
{menubranh solver}  
{MENUBRANCH Main}

Down

Move one cell down [ESC] - Previous menu  
{down}  
{menubranh help}

{esc 5}{err1}{INDICATE WORK}{WINDOWSOFF}{goto}warn1~{windowson}{windowsoff}  
{let point6i,@count(ev1..ev8192)-1}{let point6i,@string(point6i,0)}~/cpoint6i~point7i~  
{let rg3,@count(ew1..ew8192)}{let skipp,@STRING(rg3/4,0)}~  
/cex1~ex1..ex  
49  
~  
/cey1~ey1..ey  
49  
~  
{CALC}  
{goto}ey2~{end}{down}{UP 2}{let out,@cellpointer("contents")}~{left 3}/re.{right 3}{down 10}~{esc 3}

```
{INDICATE}{GOTO}EV1~{windowson}{return}
```

0.100000000000000

```
{esc 5}{err1}{INDICATE WORK}{WINDOWSOFF}{goto}warn1~{windowson}{windowsoff}{let point1h,@string((rg3+3),0)}~{let p  
/REEV2..EZ8192~{let step,(rg2-rg1)/rg3}~{let point3h,@string(rg1,15)}~{let point4h,@string(step,15)}~{let point5h,@string((rg  
{goto}ev1~  
/cev1~ev1..ev  
103  
~  
/dfew1..ew  
103  
~  
0.000000000000000  
~  
0.100000000000000  
~  
10.200000000000001  
~  
/cex1~ex1..ex  
103  
~  
/cey1~ey1..ey  
103  
~  
/cez1~ez1..ez  
103  
~{calc}  
{goto}ey2~{end}{down}{up 3}{let out,@cellpointer("contents")}~{down}/re{left 3}{down 10}~  
{INDICATE}{goto}ev1~{windowson}{windowsoff}{return}
```

```
{esc 5}{err1}{INDICATE INPUT}{getlabel "Input the lower limit - ",rg1}{let rg1,@value(rg1)}{if @STRING(rg1,0)=""}{esc}  
{IF RG1=1096300}{QUIT}  
{getlabel "Input the upper limit - ",rg2}{let rg2,@value(rg2)}{if @STRING(rg2,0)=""}{esc}  
{getlabel "Input the number of steps - ",rg3}{let rg3,@value(rg3)}{if @STRING(rg3,0)=""}{esc}  
{INDICATE WORK}~{return}
```

```
{let dummy4,dummy4-1}~{if dummy4=-1}{let dummy4,4}~{right 4}  
{if dummy4<4}{left}
```



Sheet1

{return}~

No

Cancel

{esc}

[ESC] - Previous menu

```
{let dummy4,dummy4+1}~{if dummy4=5}{let dummy4,0}~{left 4}
{if dummy4>0}{right}
{return}~
```

```
{let point1r,@cellpointer("address")}~
{return}
```

```
{esc 5}{left}{calc}/wch
a1..
```

```
~{esc 5}{right}{calc}/wch
```

```
iv1~{esc 5}{return}
```

```
{esc 5}{left 3}{calc}/wch
a1..
```

```
~{esc 5}{right 4}{calc}/wch
```

```
iv1~{left}{esc 5}{return}
```

Down

Sheet1

Move one cell down  
{WINDOWSON}{down}  
{menubranche view1}

[ESC] - Previous menu

{esc 5}/FXF{ESC 2}  
ssss  
~IT1..IT8192~r{esc 2}{RETURN}

{esc 5}{LET POINT1Q,@RIGHT(@CELLPOINTER("CONTENTS"),@LENGTH(@CELLPOINTER("CONTENTS"))-2)}~{LET P  
/Fr{esc 2}

~

/WCS132~{RIGHT}

{esc 5}{err1}{WINDOWSOFF}{let point1J,@string((RG1+1),0)}{let skippp,@STRING(@COUNT(FA1..FA8192)/4,0)}~{goto}skip  
{let step,(@MAX(FA1..FA8192)-@MIN(FA1..FA8192))/RG1}{CALC}{let point2j,MIN1}{let point3j,step1}{let point4j,max1}~{LET  
{goto}FB1~/refb1..ff8192~  
/dfFB1..FB

8

~

2.5000000000000000

~

0.1000000000000000

~

3.2000000000000000

~

{goto}fa1~/dd{esc}.{end}{down}~fb1..fb

8

~

{let skippp,@string(@COUNT(FB1..FB8192)/4,0)}~/CSKIPP~POINT8j~{ESC 3}/GRGOTXData~TYFrequency~TFFrequency D

2

~{ESC 3}

/gtbxfb1..fb

8

~

afc1..fc

8

~v{esc 3}{windowson}{return}

{esc 5}{err1}{WINDOWSOFF}{let point1K,@string(RG3,0)}{LET STEP,(@MAX(FA1..FA8192)-@MIN(FA1..FA8192))/RG3}~{  
{let point2K,MIN1}~{let point3K,step1}{let point4K,max1}~/cpoint1K~point5K~/cpoint1K~point6K~/CPOINT1K~POINT7K~

Sheet1

```
{goto}Fa1~/refb2..fE8192~  
/dfFB1..FB  
20  
~  
2.50000000000000  
~  
0.03500000000000  
~  
3.20000000000000  
~  
{let skipp,@string(@COUNT(FB1..FB8192)/4,0)}~/CSKIPP~POINT8k~{ESC 3}/GRGOTXData~TYProbability~TFNormal Distr  
5  
~{ESC 3}/CFC1~FC1..FC  
20  
~/gOFGLQQtLxfb1..fb  
20  
~  
afc1..fc  
20  
~  
v{esc 3}{windowson}{return}
```

```
{esc 5}{err1}{WINDOWSOFF}/cpoint1k~point10k~/cpoint1k~point11k~{esc 3}/rncrat~  
fa1..fc  
40  
~  
/rncrat~  
fa1..fc  
40  
~  
/pf{esc}{esc}  
TEST1  
~rrrat  
~oouqqq{ESC 3}{WINDOWSON}{return}
```

```
{esc 5}{err1}{WINDOWSOFF}/cpoint1h~point10h~/cpoint1h~point11h~{esc 3}/rncratt~  
ev1..ey  
102  
~  
/rncratt~  
ev1..ey  
102  
~
```

Sheet1

```
/pf{esc}{esc}  
ZZZ  
~rrratt  
~oouqqq{ESC 3}{WINDOWSON}{return}
```

```
{esc 5}{ONERROR TEST1,ERRMSG}
```

```
{if flag10=0}{BEEP}{getlabel "Default and program's directory should be the same!! Press [ENTER] ...",DUMMY}~/WEYY  
{esc 5}{windowson}{DISP}{GOTO}ERRMSG~{DOWN}{GETLABEL "PRESS [ENTER] TO RESTART . . .",DUMMY}~{windowson}
```

```
Down  
Move one cell down [ESC] - Previous menu  
{down}  
{menubran edit2}
```

```
Before  
The function before integration [ESC] - Previous menu  
{esc 5}{err1}{windowsoff}{esc 3}{goto}ew1~/grgofgl{esc}{esc}tXx.{end}{down}~a{left}~{end}{down}~  
otfOriginal function vs. VAR~TXVariable (VAR)~tyOriginal function~ss  
13  
~  
{esc}v{esc 3}{left}{windowson}  
{menubran graf}
```

```
Calculator  
Calculator mode  
{esc 5}{err1}{menucall menu1}  
{MENUBRANCH Main}
```

```
Arithmetic functions [ESC] - Previous menu  
{esc 5}{err1}{LET UNIT,""}~{goto}iu1~{WINDOWSON}{menuCALL arith}  
{menuBRANCH menu1}
```

Arithm

Sheet1

{branch nnn}

Addition [ESC] - Previous menu  
{esc 5}{err1}{getnumber "Input value - ",out1}~{if out1=""}{menubrand arith}  
{let out,out+out1}~  
{menubrand arith}

Add to the memory [ESC] - Previous menu  
{ESC 5}{let out2,out2+out}~  
{MENUBRANCH MEMO}

Down  
Move one cell down [ESC] - Previous menu  
{down}  
{menubrand func}

Convert\_unit

Selection and conversion of physical units [ESC] - Previous menu

```
{ESC 5}{err1}{GETNUMBER "Input value (OUT) - ",OUT}~{goto}UNIT3~{if out=""}{menubbranch unit1}
{let dummy4,0}~{MENUcall unit2}
{menubbranch unit1}{goto}iu1~
```

Down

Move one cell down

[ESC] - Previous menu

```
{down}
{menubbranch unit2}
```

## Sheet1

### Calc\_stat

Calculate statistic functions

[ESC] - Previous menu

```
{ESC 5}{if flag5=0#AND#@sum(FA1..FA8192)=0}{goto}warn~{windowson}{windowsoff}{branch point3p}
{err1}{goto}func-8~{LET DUMMY4,0}~{menucall func}
{menubrand stat}
```

### Down

Move one cell down

[ESC] - Previous menu

```
{down}
~{menubrand stat1}
```

```
{ESC 5}{err1}{windowsoff}{calc}{LET FC1,"+D$450*@count($fa$1..$fa$8192)/@EXP((FB1-$C$450)^2/$F$450)"~
{goto}FC1~{edit}{home}{del}~
{bAD}{RETURN}
```

### Function

Integrate a function inserted from the keyboard [ESC] - Previous menu

```
{ESC 5}{WINDOWSOFF}{LET FLAG9,1}{let dummy,1}/reev2..ir8192~{esc 3}{let ev8,Input2}{goto}ev1~{hiding}{windowson}{p
{MENUbranch integral1}
```

### Rectangle

Rectangle rule of integration

[ESC] - Previous menu

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}
{let ex1,"+(ev1)*(ew2-ew1)"~{let ey1,"+ex1+ey8192"}~
{goto}ex1~{edit}{home}{del}~{goto}ey1~{edit}{home}{del}~
{if dummy=1}~{bbb}
{if dummy=2}~{bab}
{MENUbranch integral}
```

### Function

Differentiate a function inserted from the keyboard [ESC] - Previous menu

```
{ESC 5}{WINDOWSOFF}{LET FLAG9,1}{let dummy,1}/reev2..ir8192~{esc 3}{let ev8,Input2}{goto}ev1~{hiding}{windowson}{p
{MENUbranch diff}
```

### 1st order

## Sheet1

Uses the formula  $dy/dx=(Y1-Y0)/h$ , works with unevenly spaced data

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}  
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}  
{let ex1,"+(ev2-ev1)/(ew2-ew1)"~  
{let eY1,"+(ev2-ev1)/(ew2-ew1)"~  
{goto}ex1~{edit}{home}{del}~  
{goto}ey1~{edit}{home}{del}~  
{if dummy=1}~{bbb}  
{if dummy=2}~{bAb}  
{MENUbranch diff1}
```





Input or edit the Derivative as a FORMULA and press ENTER ....  
Input or edit the function as a FORMULA and press ENTER ....  
Input or edit the function as a LABEL and press ENTER ....

Please import a data file first !!

Invert\_square\_matrix  
Invert a range as a square matrix (up to 70x70)  
{menucall impedit}  
{menubrand linear}

Retrieve  
Retrieve a spreadsheet which includes a matrix (see help)  
{ERR1}{getlabel "Input the file name - ",MATRIS2}~{if MATRIS2=""}{branch MATRIS3}  
{WINDOWSOFF}/rega1..ir320~{goto}ga1~{esc 3}/fcce{esc}{esc}  
MATRIX  
~{GOTO}GA1~{WINDOWSON}{menubrand impedit}

{left}{calc}/wch  
a1..

~{esc 5}{goto}is1~{calc}/wch

iv1~{esc 5}{return}

{goto}ga1~{hiding3}{windowson}{panelon}{edit}{?}~{windowsoff}{paneloff}{unhiding}{return}

{WINDOWSOFF}{err1}/rncrac~ga1..ir320~  
/xf{esc}{esc}  
LLLL  
~rac~  
R{ESC}{return}

## Sheet1

### Retrieve

Retrieve a spreadsheet which includes a matrix (see help)

```
{ERR1}{getlabel "Input the file name - ",MATRIS6}~{if MATRIS6=""}{branch MATRIS7}
{WINDOWSOFF}/rega1..ir500~{goto}ga1~{esc 3}/fcce{esc}{esc}
matrix
~{GOTO}GA1~{WINDOWSON}{menubbranch impedit1}
```

### Retrieve

Retrieve a spreadsheet which includes a matrix (see help)

```
{ERR1}{getlabel "Input the file name - ",MATRIS4}~{if MATRIS4=""}{branch MATRIS5}
{WINDOWSOFF}/rega1..ir500~{goto}ga1~{esc 3}/fcce{esc}{esc}
LINEAR
~{GOTO}GA1~{WINDOWSON}{menubbranch impedit2}
```

=====  
Output/Input  
=====

Scientific

Exponential format (x.xxE+xx)

[ESC] - Previous menu

{esc 5}{err1}{getlabel "Enter number of decimal places (0..15) ",point2f}~/cpoint2f~point2ff~

{window}~/wgfs

3

~{window}~/wgfs

3

~{menubranh setup}

Differentiation

Diferentiation of functions and data

[ESC] - Previous menu

{esc 5}{err1}{LET VAR,1}~{MENUCALL diff}

{menubranh solver}

{MENUBRANCH Main}

Up

Move one cell up

[ESC] - Previous menu

{up}

{menubranh help}



Sheet1

Quit\_123  
Yes quit LOTUS 123  
/qyyy{esc}  
{menubranh savve}

[ESC] - Previous menu

unhiding

unhiding2

Up

Sheet1

Move one cell up  
{WINDOWSON}{up}  
{menubranchn view1}

[ESC] - Previous menu





Up  
Move one cell up [ESC] - Previous menu  
{up}  
{menubran ch edit2}

after  
The function after integration [ESC] - Previous menu  
{esc 5}{err1}{windowsoff}{esc 3}{goto}ew1~/grgofgl{esc}{esc}tXx.{end}{down}~a{right 2}.{end}{down}~  
otfProcessed function vs. VAR~TXVariable (VAR)~tyProcessed function~ss  
~  
{esc}v{esc 3}{left}{windowson}  
{menubran ch graf}

Solver  
Integration and differentiation of functions and data  
{esc 5}{err1}{menuCALL solver}  
{MENUBRAN CH Main}

Functions

Calculate mathematical functions [ESC] - Previous menu  
{esc 5}{err1}{if flag8=1}{branch point2Q}  
{goto}output1~{windowsoff}{goto}FUNCC~{left}/fccc{esc 2}FUNC~{esc 3}

Sheet1

```
{err1}{goto}iu1~{LET FLAG8,1}{let flag6,0}{let flag7,1}~{WINDOWSON}{menucall func}  
{menuBRANCH menu1}{BRANCH NNN}
```

Subtraction [ESC] - Previous menu -

```
{esc 5}{err1}{getnumber "Input value - ",out1}~{if out1=""}{menubrand arith}  
{let out,out-out1}~  
{menubrand arith}
```

Subtract from the memory [ESC] - Previous menu - M

```
{ESC 5}{let out2,out2-out}~  
{MENUBRANCH MEMO}
```

Up [ESC] - Previous menu

```
Move one cell up  
{up}  
{menubrand func}
```

Insert\_edit\_unit

Insert a new unit above the highlighted [ESC] - Previous menu

```
{INDICATE}{let flag11,0}~{ESC 5}{err1}{goto}unit3~{let dummy4,0}~{indicate INS}{menucall edit2}  
{menubrand unit1}{goto}iu1~
```

Up

Move one cell up

[ESC] - Previous menu

```
{up}
```

```
{menubrand unit2}
```

## Sheet1

### Import\_edit

Editing, Importing or adding statistic functions [ESC] - Previous menu

```
{ESC 5}{WINDOWSOFF}{err1}{esc 3}{goto}fa1~{LET DUMMY4,0}~{windowson}{MENUcall STAT1}
{menuBRANCH stat}
```

### Up

Move one cell up

[ESC] - Previous menu

```
{up}
~{menubranchn stat1}
```

### editstat

### Data

Integrate a function imported as a file of numbers [ESC] - Previous menu

```
{ESC 5}{err1}{LET FLAG9,2}{getlabel "input file name - ",dummy}~{if dummy=""}{menubranchn integral1}
{WINDOWSOFF}{if dummy<>""}{let ev1,dummy}{let point5i,dummy}{let dummy,2}{goto}ev1~{menubranchn integral}
```

### Trapezoid

Trapezoid rule of integration [ESC] - Previous menu

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}
{let ex1,"+(ev2+ev1)*(ew2-ew1)/2"}~{let ey1,"+ex1+ey8192"}~
{goto}ex1~{edit}{home}{del}~{goto}ey1~{edit}{home}{del}~
{if dummy=1}~{bbb}
{if dummy=2}~{bab}
{MENUbranch integral}
```

### Data

Differentiate a function imported as a file of numbers

```
{ESC 5}{err1}{LET FLAG9,2}{getlabel "Input file name - ",dummy}~{if dummy=""}{menubranchn diff}
{WINDOWSOFF}{if dummy<>""}{let ev1,dummy}{let point5i,dummy}{let dummy,2}{goto}ev1~{menubranchn DIFF1}
```

### 2nd order

Sheet1

Uses  $dy^2/dx^2=(Y2-2*Y1+Y0)/h^2$ , (works only with evenly spaced data)

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}
{let ex1,"+(ev3-2*EV2+ev1)/((ew2-ew1)^2)"~
{let eY1,"+(ev3-2*EV2+ev1)/((ew2-ew1)^2)"~
{goto}ex1~{edit}{home}{del}~
{goto}ey1~{edit}{home}{del}~
{if dummy=1}~{bbb}
{if dummy=2}~{bAb}
{MENUbranch diff1}
```

dummy1a

flag2  
flag5  
FLAG9

Working... please wait



Multiply\_matrices

Multiply two ranges as matrices or vectors (up to 70x70)

{menucall impedit1}

{menubrand linear}

Edit

Edit a matrix or a vector

[ESC] - Previous menu

{GOTO}WARN1~{WINDOWSON}{windowsoff}{goto}ga1~{hiding3}{goto}ga1~{windowson}{panelon}{edit}{?}~{windowsoff}{pa

{menubrand impedit}



=====  
=====  
|  
=====

currency

Currency format (\$x,xxx.xx)

[ESC] - Previous menu

```
{esc 5}{err1}{getlabel "Enter number of decimal places (0..15) ",point3f}~/cpoint3f~point3ff~
```

```
{window}~/wgfc
```

```
4
```

```
~{window}~/wgfc
```

```
~{menubranh setup}
```

Curve\_fit

Regression curve fitting (Polynomial, Power, Exponential, Multi-linear)

```
{esc 5}{err1}{if flag2=1}{branch point2m}
```

```
{goto}output1~{windowsoff}{goto}curv~{left}/fcce{esc 2}curfit1A~{esc 3}
```

```
{let flag2,1}~/reev1..IR8192~{menucall curmenu}
```

```
{menubranh solver}
```

Next

Next page

[ESC] - Previous menu

```
{pgdn}
```

```
{menubranh help}
```



Sheet1

Program\_quit

Yes quit the calculator and return to Lotus

/weyyy{esc}

[ESC] - Previous menu

RG1

RG4

{esc 5}/wcda1..iv1~{return}

{esc 5}/wcda1..iv1~{return}

Next

Next page  
{WINDOWSON}{pgdn}~  
{menubran view1}

[ESC] - Previous menu

DISP

edit5

Right

Move one cell to the right

[ESC] - Previous menu

```
{right1}
```

```
{menubranch edit2}
```

Data\_save

Save the data table for creating the graph [ESC] - Previous menu

```
{esc 5}{err1}{getlabel "input the file name - ",point9h}{dataa}
```

```
{menuBRANCH graf}
```

Format

Set global format

```
{esc 5}{err1}{menucall setup}
```

```
{MENUBRANCH Main}
```

Units

Selection and conversion of physical units [ESC] - Previous menu

```
{esc 5}{err1}{let flag6,0}{let flag7,2}{MENUcall unit1}
```

```
{menuBRANCH menu1}
```



Sheet1

{branch nnn}

\*

Multiplication [ESC] - Previous menu  
{esc 5}{err1}{getnumber "Input value - ",out1}~{if out1=""}{menubrand arith}  
{let out,out\*out1}~  
{menubrand arith}

\* M

Multiply memory [ESC] - Previous menu  
{ESC 5}{let out2,out2\*out}~  
{MENUBRANCH MEMO}

Right  
Move one cell to the right [ESC] - Previous menu  
{right1}  
{menubrand func}

Override\_edit\_unit

Override an existing unit

[ESC] - Previous menu

```
{INDICATE}{let flag11,1}~{ESC 5}{err1}{goto}unit3~{let dummy4,0}~{indicate OVER}{menucall edit2}  
{menubrand unit1}{goto}iu1~
```

Right

Move one cell to the right

[ESC] - Previous menu

```
{right1}  
{menubrand unit2}
```

## Sheet1

### Freq\_dist

Frequency distribution

[ESC] - Previous

```
{ESC 5}{if flag5=0#AND#@SUM(FA1..FA8192)=0}{goto}warn~{windowson}{windowsoff}{branch point3p}
{err1}{esc 3}{getnumber "input the number of intervals (bins) - ",rg1}{if rg1<2}{branch point2p}
{goto}warn1~{windowson}{windowsoff}{bac}
{menuBRANCH stat}
```

### Number\_edit

Insert numbers manually

```
{ESC 5}{getlabel "Insert the new number - ",dummy}{if dummy=""}{branch point2g}
{let dummy,@value(dummy)}~/cdummy~~{down}{branch point1g}
~{menubranchnum stat1}
```

### Insert\_edit\_func

Insert a new function above the highlighted [ESC] - Previous menu

```
{INDICATE}{let flag11,0}~{ESC 5}{err1}{goto}func-8~{let dummy4,0}~{indicate INS}{menucall edit2}
{menubranchnum editstat}{goto}iu1~
```

### Help

On line help

```
{ESC 5}{err1}{mark}{windowsoff}{GOTO}HEP5~/REIV1..IV8192~/FIT{ESC 2}HELP5~{goto}hep5A~{WINDOWSON}{menucall
{goback}{windowson}{menubranchnum integral1}
```

### A\_Romberg

Romberg rule of integration

[ESC] - Previous menu

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}
{let ex1,"+(ev2+ev1)*(ew2-ew1)/2+((EV2+EV1)*(EW2-EW1)-(EV3+EV1)*(EW3-EW1)/2)/6"}~{let ey1,"+ex1+ey8192"}~
{goto}ex1~{edit}{home}{del}~{goto}ey1~{edit}{home}{del}~
{if dummy=1}~{bbb}
{if dummy=2}~{bab}
{MENUbranch integral}
```

### Help

On line help

```
{ESC 5}{err1}{mark}{windowsoff}{GOTO}HEP6~/REIV1..IV3000~/FIT{ESC 2}HELP6~{goto}hep6~{WINDOWSON}{menucall
{goback}{windowson}{menubranchnum diff}
```

### 3rd order

Sheet1

Uses  $dy_3/dx_3=(Y_3-3*Y_2+3*Y_1-Y_0)/h^3$ , (works only with evenly spaced data)

```
{ESC 5}{err1}{WINDOWSOFF}{if dummy=1}{inp}
{err1}{WINDOWSOFF}{if dummy=2}{BAB1}
{let ex1,"+(ev4-3*EV3+3*EV2-ev1)/((ew2-ew1)^3)"~
{let eY1,"+(ev4-3*EV3+3*EV2-ev1)/((ew2-ew1)^3)"~
{goto}ex1~{edit}{home}{del}~
{goto}ey1~{edit}{home}{del}~
{if dummy=1}~{bbb}
{if dummy=2}~{bAb}
{MENUbranch diff1}
```

TIM



Linear\_equations\_solver

Solve a set of linear algebraic equations (up to 70 unknown)

{mencall impedit2}

{menubrand linear}

Clear

Clear the worksheet

{windowsoff}/rega1..ir320~{WINDOWSON}{WINDOWSOFF}

{menubrand impedit}

Sheet1

2nd\_matrix\_edit

Edit the 2nd matrix

[ESC] - Previous menu

{GOTO}WARN1~{WINDOWSON}{windowsoff}{goto}ga80~{hiding3}{goto}ga80~{windowson}{panelon}{edit}{?}~{windowsoff}{  
{menubranh impedit1}

2nd\_matrix\_edit

Edit the 2nd matrix

[ESC] - Previous menu

{GOTO}WARN1~{WINDOWSON}{windowsoff}{goto}ga80~{hiding3}{goto}ga80~{windowson}{panelon}{edit}{?}~{windowsoff}{  
{menubranh impedit2}



General

Standard format (x.xx or x.xxE+xx)

[ESC] - Previous menu

{esc 5}{err1}{window}~/wgfg

~{window}~/wgfg

{esc 3}{menubran setup}

Root\_find

Root finding problems (for example:  $\text{COS}(X)-X=0$ )

{esc 5}{err1}{if flag3=1}{branch point3N}

{goto}IU1~{windowsoff}{goto}ROOT~/fcce{esc 2}ROOT1A~{esc 3}

{let flag3,1}~/reev1..IR8192~{LET VAR,1}{menucall ROOTmenu}

{menubran solver}

Previous

Previous page

[ESC] - Previous menu

{pgup}~

{menubran help}

BAB1

Save

Save the formuals [ESC] - Previous menu

{esc 5}{err1}/FXF{ESC 2}FORMULAS~L1..EQ8192~

r

hiding1

Previous

Previous page  
{WINDOWSON}{pgup}~  
{menubranchn view1}

[ESC] - Previous menu

{RETURN}

```
{if flag11=0}{windowsoff}/M.{end}{down}~{down}~{WINDOWSON}{WINDOWSOFF}  
{if flag11=2}{windowsoff}{down}/m.{end}{down}~{up}~{RIGHT 5}/M.{END}{DOWN}~{UP}~{RIGHT 5}/M.{END}{DOWN}~{UP}~  
{return}
```

Left

Move one cell to the left

[ESC] - Previous menu

{left1}

{menubranchedit2}

Graph\_save

Save graph as a .PIC file

{esc 5}{err1}{GETLABEL "Input file name - ",point7n}~{if point7n=""}{branch point8p}

/GS{esc}

~rq{menubranchedit2}

Quit

Quit, Save FORMULAS.WK1 file, or exit to DOS without quitting the program

{esc 5}{err1}{menucall savve}

{MNUBRANCH Main}

Statistics

Editing or calculating statistic functions [ESC] - Previous menu

{esc 5}{err1}{let flag6,1}{let flag7,3}{MNUcall STAT}

{menuBRANCH menu1}

Sheet1

{branch nnn}

Division [ESC] - Previous menu  
{esc 5}{err1}{getnumber "Input value - ",out1}~{if out1=""}{menubrand arith}  
{let out,out/out1}~  
{menubrand arith}

/

Divide memory [ESC] - Previous menu  
{ESC 5}{let out2,out2/out}~  
{MNUBRANCH MEMO}

/ M

Left  
Move one cell to the left [ESC] - Previous menu  
{left1}  
{menubrand func}

Delete\_edit\_unit

Delete an existing unit and shift the others up [ESC] - Previous menu

```
{INDICATE}{let flag11,2}~{ESC 5}{err1}{goto}unit3~{let dummy4,0}~{indicate DEL}{menucall edit2}  
{menubrand unit1}{goto}iu1~
```

Left

Move one cell to the left

[ESC] - Previous menu

```
{left1}
```

```
{menubrand unit2}
```

## Sheet1

### Norm\_dist

Normal distribution [ESC] - Previous menu  
{ESC 5}{if flag5=0#AND#@SUM(FA1..FA8192)=0}{goto}warn~{windowson}{windowsoff}{branch point3p}  
{err1}{esc 3}{getnumber "input the number of data points (10 minimum) - ",rg3}{if rg3=""#or#rg3<=9}{branch point2p}  
{goto}warn1~{windowson}{windowsoff}{normal}  
{menuBRANCH stat}

### Import

Import data file (list of numbers) [ESC] - Previous menu  
{ESC 5}{ERR1}{let flag5,1}{getlabel "Input the file name - ",point1c}~{if point1c=""}{branch point1p}  
/refa1..fc8192~{goto}fa1~{esc 3}/fin{esc}{esc}  
ISRA6  
~{menubranchn stat1}

### Override\_edit\_func

Override an existing function [ESC] - Previous menu  
{INDICATE}{let flag11,1}~{ESC 5}{err1}{goto}func-8~{let dummy4,0}~{indicate OVER}{menucall edit2}  
{menubranchn editstat}{goto}iu1~

### Graph

Show graph before and after integration [ESC] - Previous menu  
{ESC 5}{err1}{menucall graf}  
{esc 3}{MENUbranch integral}

### Graph



Sheet1

Show graph before and after differentiation  
{ESC 5}{menucall graf}  
{esc 3}{MENUbranch diff1}

[ESC] - Previous menu

```
{LET VAR,@SECOND(@NOW)}~  
{IF (VAR<=DUMMY+3#AND#VAR>=DUMMY)#OR#(VAR+60-DUMMY<=3)}{BRANCH TIM}  
{RETURN}
```

flag3  
flag3a  
flag10



Help

On line help

{err1}{mark}{windowsoff}{GOTO}HEP9~/REIV1..IV3000~/FIT{ESC 2}HELP9~{GOTO}HEP9~{WINDOWSON}{menucall helpp  
{goback}{WINDOWSON}{menubbranch LINEAR}

Invert

Invert a range as a square matrix

{indicate WORK}{goto}warn1~{windowsoff}{goto}ga1~/REGA160..IV320~/RNCFIRST~ga1..ga1~/RNCFIRST~.{end}{down}{e  
{indicate}{menubbranch impedit}

Clear

Clear the worksheet

{windowsoff}/rega1..ir320~{WINDOWSON}{WINDOWSOFF}  
{menubranh impedit1}

Clear

Clear the worksheet

{windowsoff}/rega1..ir320~{WINDOWSON}{WINDOWSOFF}  
{menubranh impedit2}

=====

=====

|

=====

Percent

Percent format (x.xx%) [ESC] - Previous menu

{esc 5}{err1}{getlabel "Enter number of decimal places (0..15) ",point4f}~/cpoint4f~point4ff~

{window}~/wgfp

4

~{window}~/wgfp

~{menubrand setup}

Matrices

Invert, Multiply, Linear equation solving

{esc 5}{menucall linear}

{menubrand solver}

/REEV2..IR8192~

{goto}ev1~

/fin{esc 2}

isra4

~

## Sheet1

Dos

Exit to DOS without quitting the program

{esc 5}{err1}{esc 3}/s

{menubranh savve}

[ESC] - Previous menu

RG2

RG5

{esc 5}{left}{calc}/wch

a1..

~{esc 5}{right 3}{calc}/wch

iv1~{left 2}{esc 5}{return}

RETRIV

Edit

Sheet1

Enter edit mode (when you are finished press ENTER)

{WINDOWSOFF}{PANELOFF}{HIDING}{WINDOWSON}{PANELON}{EDIT}{?}~{WINDOWSOFF}{PANELOFF}{UNHIDING}  
{menubran view1}





Next  
Next page  
{pgdn}~  
{menubran edit2}

[ESC] - Previous menu

Help  
On line help  
{esc 5}{err1}{MARK}{windowsoff}{GOTO}HEP1~/REIV1..IV8192~/Fit{esc 2}HELP1~{WINDOWSON}{menuCALL helpp}  
{GOBACK}{windowson}{MENUBRANCH Main}

Clear the output/input display  
{esc 5}{err1}{LET OUT,0}~  
{MENUBRANCH MENU1}

[ESC] - Previous menu

Clear

Sheet1

{branch nnn}

Square root  
{esc 5}{err1}{let out,out^.5}~  
{MENUBRANCH arith}

[ESC] - Previous menu

SQRT

Clear memory  
{ESC 5}{let out2,0}~  
{MENUBRANCH MEMO}

[ESC] - Previous menu

C M

Next  
Next page  
{pgdn}  
{menubbranch func}

[ESC] - Previous menu

Help

On line help

{ESC 5}{err1}{mark}{windowsoff}{goto}hep3~/reiv1..iv8192~/fit{esc 2}help3~{GOTO}HEP2C~{windowson}{menubranh help  
{goback}{WINDOWSON}{menubranh unit1}

Next

Next page

{pgdn}~

{menubranh unit2}

[ESC] - Previous menu

## Sheet1

### Data\_save

Saves the data tables for creating the graphs [ESC] - Previous menu  
{esc 3}{err1}{getlabel "input the file name - ",point9k}~{if point9k=""}{branch point3p}  
{data}  
{menuBRANCH stat}

### Clear

Clear the numbers range [esc] - previous menu  
{ESC 5}/refa1..fc8192~{GOTO}FA1~  
{menubranchn stat1}

### Delete\_edit\_func

Delete an existing function and shift the others up [ESC] - Previous menu  
{INDICATE}{let flag11,2}~{ESC 5}{err1}{goto}func-8~{let dummy4,0}~{indicate DEL}{menucall edit2}  
{menubranchn editstat}{goto}iu1~

### Help

#### On line help

{esc 5}{err1}{mark}{IF FLAG9=1}{windowsoff}{GOTO}HEP5~/REIV1..IV3000~/FIT{ESC 2}HELP5~{goto}hep5B~{WINDOWSON}  
{err1}{IF FLAG9=2}{windowsoff}{GOTO}HEP5~/REIV1..IV3000~/FIT{ESC 2}HELP5~{goto}hep5C~{WINDOWSON}{menucall  
{goback}{windowson}{menubranchn integral}

### Help

Sheet1

On line help

```
{esc 5}{err1}{mark}{IF FLAG9=1}{windowsoff}{GOTO}HEP6~/REIV1..IV3000~/FIT{ESC 2}HELP6~{goto}hep6a~{WINDOWSON}
{err1}{IF FLAG9=2}{windowsoff}{GOTO}HEP6~/REIV1..IV3000~/FIT{ESC 2}HELP6~{goto}hep6B~{WINDOWSON}{menucall}
{goback}{windowson}{menubbranch diff1}
```

defolt



Data\_save

Saves the matrices spreadsheet

[ESC] - Previous menu

```
{esc 3}{err1}{getlabel "input the file name - ",matris}~{if matris=""}{branch matris1}
```

```
{ddata}
```

```
{menubrand impedit}
```



## Sheet1

### Multiply

Multiply two ranges as matrices

```
{indicate work}{goto}warn1~{windowsoff}/rega160..ir320~{goto}ga1~/rncfirst~ga1..ga1~/rncfirst~.{end}{down}{end}{right}~  
{if @cell("type",gb80..gb80)<>"b"}{goto}ga80~/rncsecond~ga80..ga80~/rncsecond~.{end}{down}{end}{right}~/dmmfirst~second  
{if @cell("type",gb80..gb80)="b"}{goto}ga80~/rncsecond~ga80..ga80~/rncsecond~.{end}{down}~/dmmfirst~second~ga240..ga  
{indicate}{menubrand impedit1}
```

### Solve

Solve a set of linear equations

```
{indicate work}{goto}warn1~{windowsoff}{goto}ga1~/rega160..ir320~/rncfirst~ga1..ga1~/rncfirst~.{end}{down}{end}{right}~{got  
{goto}ga160~/rnctthird~ga160..ga160~/rnctthird~.{end}{down}{end}{right}~  
/dmmthird~second~ga240..ga240~{goto}ga240~{windowson}{windowsoff}  
{indicate}{menubrand impedit2}
```

Help

On line help

{esc 5}{err1}{mark}{windowsoff}{GOTO}HEP5~/REIV1..IV8192~/FIT{ESC 2}HELP5~{goto}hep5~{WINDOWSON}{menucall h  
{goback}{windowson}{menubran solver}

unhiding1

```
{esc 5}{LET POINT1Q,@RIGHT(@CELLPOINTER("CONTENTS"),@LENGTH(@CELLPOINTER("CONTENTS"))-2)}~{LET P  
/Fcce  
SSSS  
~{WINDOWSON}{RETURN}
```

Save

## Sheet1

Save the description file

```
{esc 5}{WINDOWSOFF}{getlabel "File name (press ENTER for no changes) - ",DUMMY}~  
{IF DUMMY=""}{LET OUT,"FN"}~{LET DUMMY,OUT&POINT1Z}{LET OUT,0}~{SAVE2}{branch point1v}  
{LET POINT1Z,DUMMY}~{LET OUT,"FN"}~{LET DUMMY,OUT&DUMMY}~{LET OUT,0}~{SAVE2}  
{WINDOWSON}{WINDOWSOFF}{menubranchn view1}
```

Previous  
Previous page  
{pgup}~  
{menubrand edit2}

[ESC] - Previous menu

Help  
On line help  
{esc 5}{err1}{MARK}{windowsoff}{GOTO}HEP2~/REIV1...IV8192~/Flt{esc 2}HELP2~{WINDOWSON}{menuCALL helpp}  
{GOBACK}{WINDOWSON}{MENUMBRANCH MENU1}

Sheet1

{branch nnn}

Power of 2

{esc 5}{err1}{let out,out^2}~  
{MENUBRANCH arith}

[ESC] - Previous menu

X^2

Transfer the value from memory to the output

{ESC 5}{esc 5}{let out,out2}~  
{MENUBRANCH MEMO}

[ESC] - Previous menu

R M

Previous

Previous page

{pgup}~  
{menubrand func}

[ESC] - Previous menu

Previous  
Previous page  
{pgup}~  
{menubrand unit2}

[ESC] - Previous menu

## Sheet1

### Graph\_save

Save graph as a .PIC file

```
{ESC 5}{err1}{GETLABEL "Input file name - ",point8n}~{if point8n=""}{branch point2p}
```

```
{WINDOWSOFF}/GS{esc}
```

```
TEST1
```

```
~rq{esc 3}
```

```
{WINDOWSON}{menubranchn stat}
```

### Func\_edit

Edit statistic functions

[ESC] - Previous menu

```
{ESC 5}{WINDOWSOFF}{goto}func-8~{let dummy,0}~{WINDOWSON}{menucall editstat}
```

```
{menubranchn stat1}
```

### Help

On line help

```
{ESC 5}{err1}{mark}{windowsoff}{GOTO}HEP4~/REIV1..IV8192~/FIT{ESC 2}HELP4~{goto}hep4A~{WINDOWSON}{menucall}
```

```
{goback}{windowson}{menubranchn editstat}
```



C:\345

flag6  
flag7  
flag11



Help

On line help

{err1}{mark}{windowsoff}{GOTO}HEP9~/REIV1..IV3000~/FIT{ESC 2}HELP9~{GOTO}HEP9A~{WINDOWSON}{menucall help

{goback}{WINDOWSON}{menubbranch impedit}

## Sheet1

Data\_save

Saves the matrices spreadsheet

[ESC] - Previous menu

```
{esc 3}{err1}{getlabel "input the file name - ",matris}~{if matris=""}{branch matris1}
```

```
{ddata}
```

```
{WINDOWSON}{menubbranch impedit1}
```

Data\_save

Saves the matrices spreadsheet

[ESC] - Previous menu

```
{esc 3}{err1}{getlabel "input the file name - ",matris}~{if matris=""}{branch matris1}
```

```
{ddata}
```

```
{WINDOWSON}{menubbranch impedit2}
```

```
{IF FLAG10=1#OR#@CELL("TYPE",L1..L1)="L"}WEY  
{RETURN}
```

RG3

RG6

{esc 5}/wcda1..iv1~{return}

GOBACK

Edit

Edit or add a function [ESC] - Previous menu

```
{IF FLAG11=2}{EDIT5}{branch POINT9M}~  
{esc 5}{err1}{WINDOWSOFF}{edit5}{getlabel "Input the new function name - ",dummy}~{IF DUMMY<>""}/cdummy~~  
{right 5}{hiding}{edit5}{windowson}{panelon}{edit}{?}~{windowsoff}{paneloff}{unhiding}  
{right 5}{WINDOWSON}{WINDOWSOFF}{edit5}{getlabel "Description - ",dummy}~  
{IF @UPPER(@LEFT(DUMMY,2))="FN"}/cdummy~~{let point1z,@right(dummy,(@length(dummy)-2))}~{LET POINT1R,@CE  
{if dummy=""#and#@upper(@left(@cellpointer("contents"),2))="FN"}{let point1r,@cellpointer("address")}{LET DUMMY,@CEL  
{IF DUMMY<>""}/cdummy~~  
{windowson}{windowsoff}{LEFT 10+dummy4}{right dummy4}  
{WINDOWSON}{MENUBRANCH EDIT2}
```



Sheet1

Memory

Memory functions menu

{esc 5}{err1}{menucall memo}

{MENUBRANCH arith}

[ESC] - Previous menu

Exchange output/input value with memory

[ESC] - Previous menu

{esc 5}{let dummy,out2}~{let out2,out}~{let out,dummy}~

{MENUBRANCH MEMO}

Calculate

Calculate the function

[ESC] - Previous menu

{ESC 5}{WINDOWSOFF}{right 5}{if @upper(@left(@cellpointer("contents"),2))="FN"}{let dummy,@cellpointer("contents")}~{L

{if flag6=1}{branch point2b}

{err1}{windowsoff}{left 5}{RIGHT 5}{if @upper(@left(@CELLPOINTER("CONTENTS"),11))<>"SPREADSHEET"}{GETNUMBE

{if @upper(@left(@CELLPOINTER("CONTENTS"),11))="SPREADSHEET"}{LET POINT4B,@RIGHT(@CELLPOINTER("CO

spreadsheetc:\win\kital87.wk1

~{BRANCH POINT1B}

{edit}{home}{del}~/cg1~g4~

{let out,\$G\$4}~/re\$g\$4..\$g\$4~

{edit}{home}'~{LEFT 5}{windowson}

{menubbranch func}

Assign\_unit

Assign units to the output number

[ESC] - Previous menu

{ESC 5}{err1}{WINDOWSON}/c~unit~{windowsoff}{right 5}/c~out3~{left 5}{windowson}{menubranh unit2}  
{menubranh unit2}

Sheet1

Help

On line help

{ESC 5}{err1}{mark}{windowsoff}{GOTO}HEP4~/REIV1..IV3000~/FIT{ESC 2}HELP4~{GOTO}HEP4~{WINDOWSON}{menuca  
{goback}{WINDOWSON}{menuBRANCH stat}

Help

On line help

{ESC 5}{err1}{mark}{windowsoff}{GOTO}HEP4~/REIV1..IV8192~/FIT{ESC 2}HELP4~{goto}hep4A~{WINDOWSON}{menucall  
{goback}{windowson}{menubranchn stat1}



{windowsoff}{LEFT 10+dummy4}{right dummy4}{windowson}{menubranh edit2}

Sheet1

Help

On line help

```
{err1}{mark}{windowsoff}{GOTO}HEP9~/REIV1..IV3000~/FIT{ESC 2}HELP9~{GOTO}HEP9B~{WINDOWSON}{menucall help}
{goback}{WINDOWSON}{menubbranch impedit1}
```

Help

On line help

```
{err1}{mark}{windowsoff}{GOTO}HEP9~/REIV1..IV3000~/FIT{ESC 2}HELP9~{GOTO}HEP9C~{WINDOWSON}{menucall help}
{goback}{WINDOWSON}{menubbranch impedit2}
```



{ESC 5}{GOTO}  
\$EB\$12  
~{WINDOWSON}{WINDOWSOFF}{RETURN}



Help

On line help

```
{esc 5}{err1}{mark}{if flag7=2}{windowsoff}{GOTO}HEP3~/REIV1..IV3000~/FIT{ESC 2}HELP3~{GOTO}HEP2g~{WINDOWSON}
{err1}{if flag7=3}{windowsoff}{GOTO}HEP4~/REIV1..IV3000~/FIT{ESC 2}HELP4~{GOTO}HEP4B~{WINDOWSON}{menucall
{err1}{if flag7=1}{windowsoff}{GOTO}HEP2~/REIV1..IV3000~/FIT{ESC 2}HELP2~{GOTO}HEP2f~{WINDOWSON}{menucall
{goback}{WINDOWSON}{menubranh edit2}
```

Sheet1

Help

On line help [ESC] - Previous menu

```
{esc 5}{err1}{MARK}{windowsoff}{GOTO}HEP2~/REIV1..IV8192~/FIT{ESC 2}HELP2~{GOTO}HEP2A~{WINDOWSON}{menu  
{GOBACK}{WINDOWSON}{MENUBRANCH arith}
```

Help

On line help

```
{esc 5}{err1}{MARK}{windowsoff}{GOTO}HEP2~/REIV1..IV3000~/FIT{ESC 2}HELP2~{GOTO}HEP2~{WINDOWSON}{menu  
{GOBACK}{WINDOWSON}{menubranh memo}
```

View\_description

View the description [ESC] - Previous menu

```
{ESC 5}{windowsoff}{err1}{right 10}{windowson}{windowsoff}{getlabel "Press ENTER to continue ... ",dummy}  
{if @upper(@left(@cellpointer("contents"),2))="FN"}{let point1r,@cellpointer("address")}{LET DUMMY,@CELLPOINTER("CO  
{windowsoff}{LEFT 10+dummy4}{right dummy4}{windowson}{menubranh func}
```

Convert

Convert to the highlighted units

[ESC] - Previous menu

{ESC 5}{err1}{windowsoff}/c~unit~{right 5}/c~out4~{let out,out\*out3/out4}~

{LET OUT3,OUT4}~{LEFT 5}{WINDOWSON}

{menubranh unit2}





RG7













Scientific and Engineering Tool for Lotus 1-2-3

Version 1.2

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of Lotus Development Corporation

Developed and Written by Israel Kehaty

Using this program the user can do:

-----

- Simple arithmetic
- Functions editing and calculation
- Physical units definition and conversion
- Integration and Differentiation of functions/tables
- Editing and calculating statistic functions
- Frequency and normal distribution
- Curve fitting (4 types)
- Root finding (including non-linear equations)
- Matrix operations
- Simultaneous linear equations

## Sheet1

### THIS IS AN EXAMPLE OF A DESCRIPTION DUCUMENT

This function calculates the cosine of an angle. The cosine is written in Lotus as @COS(). If you are not familiar with trigonometric functions any good college book will help.