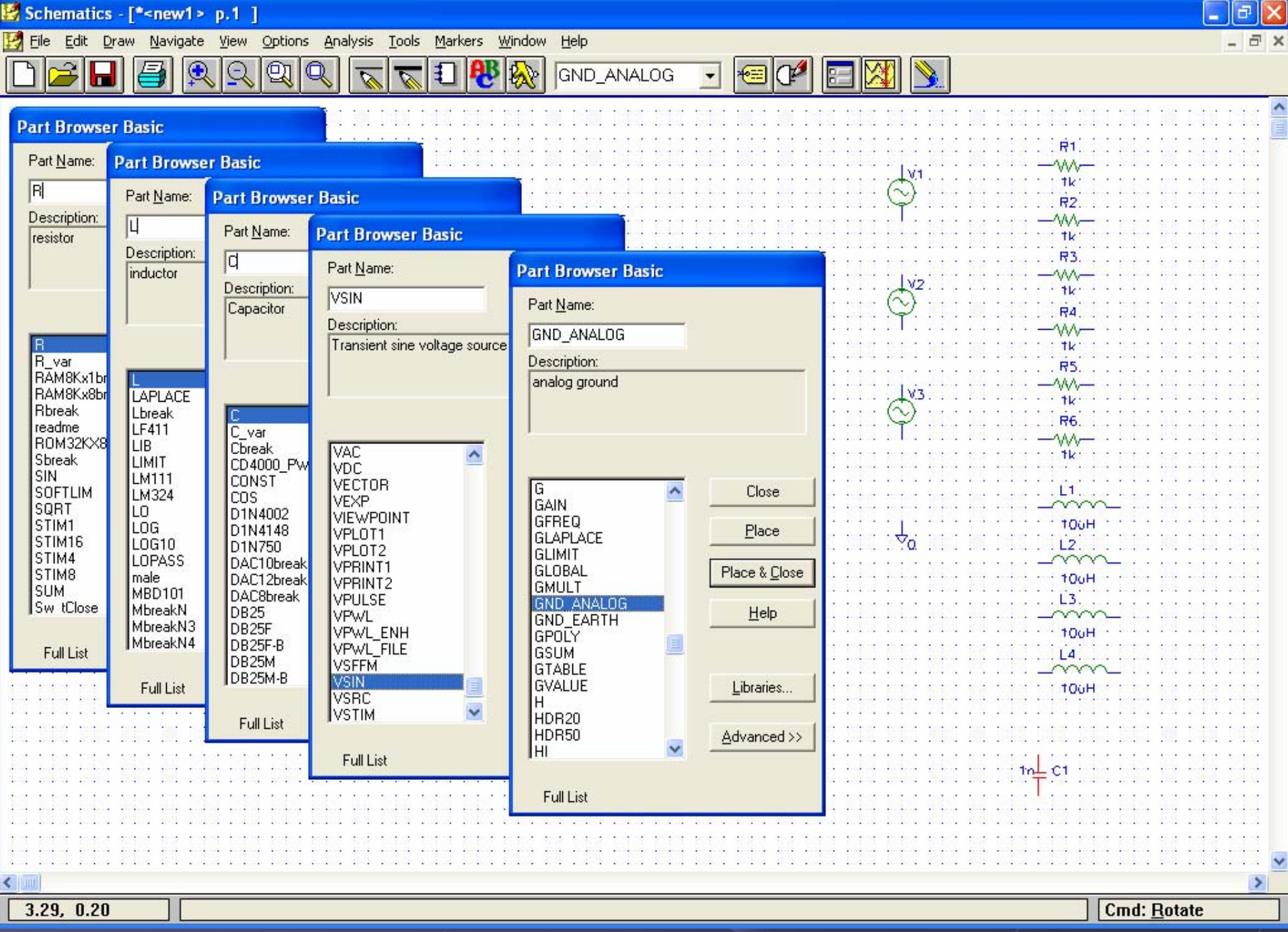
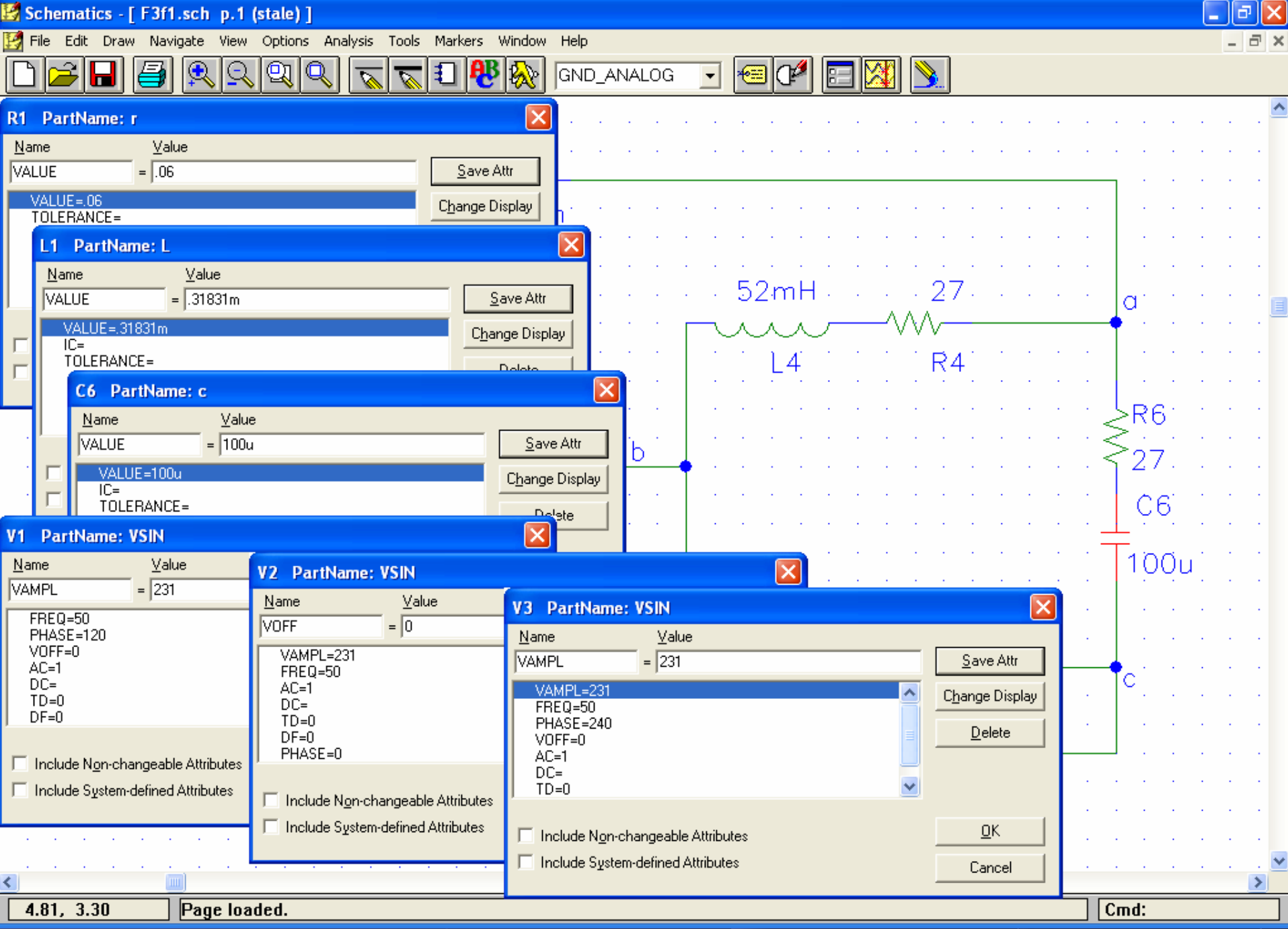
VILLAMOSSÁGTAN

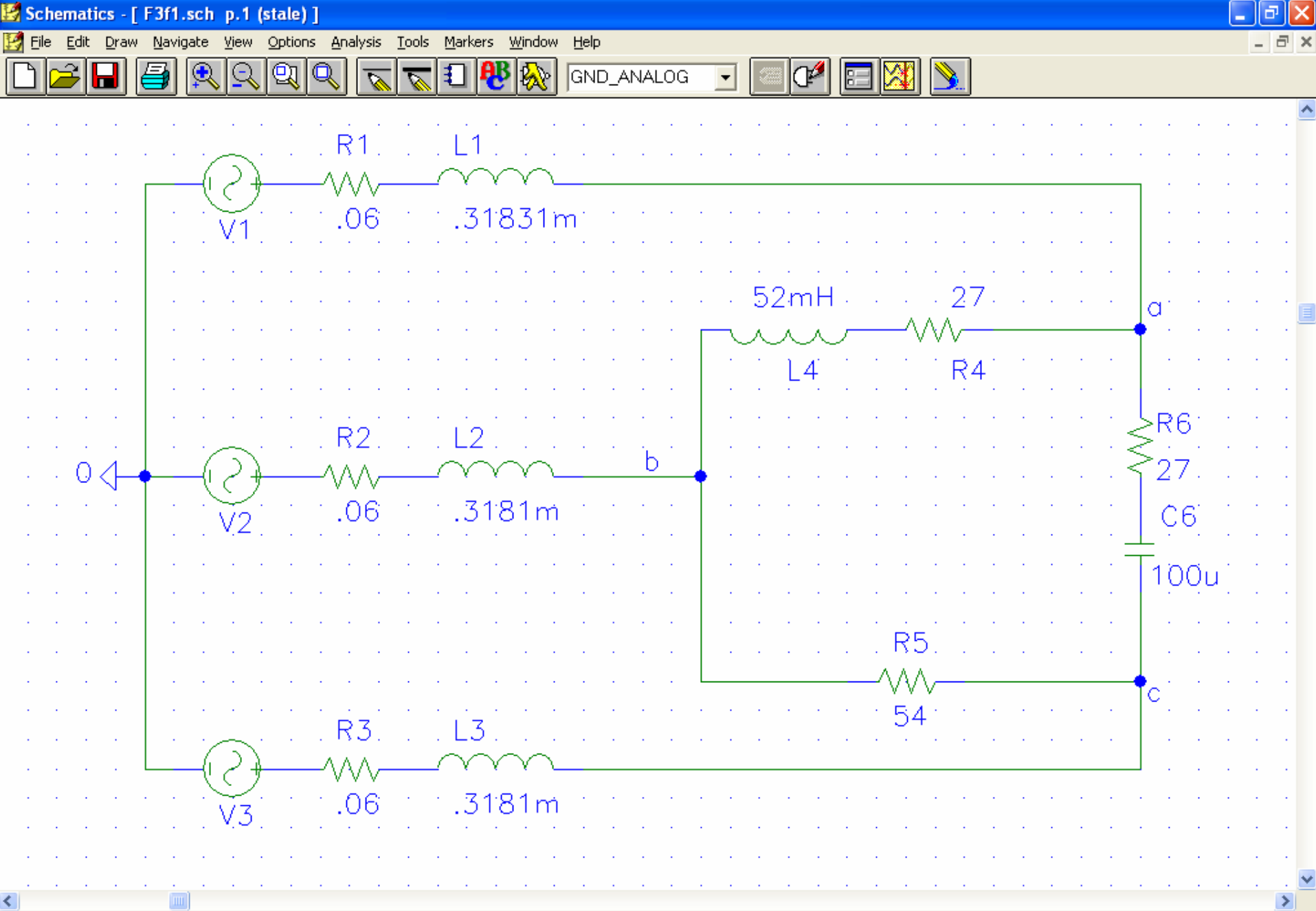
III

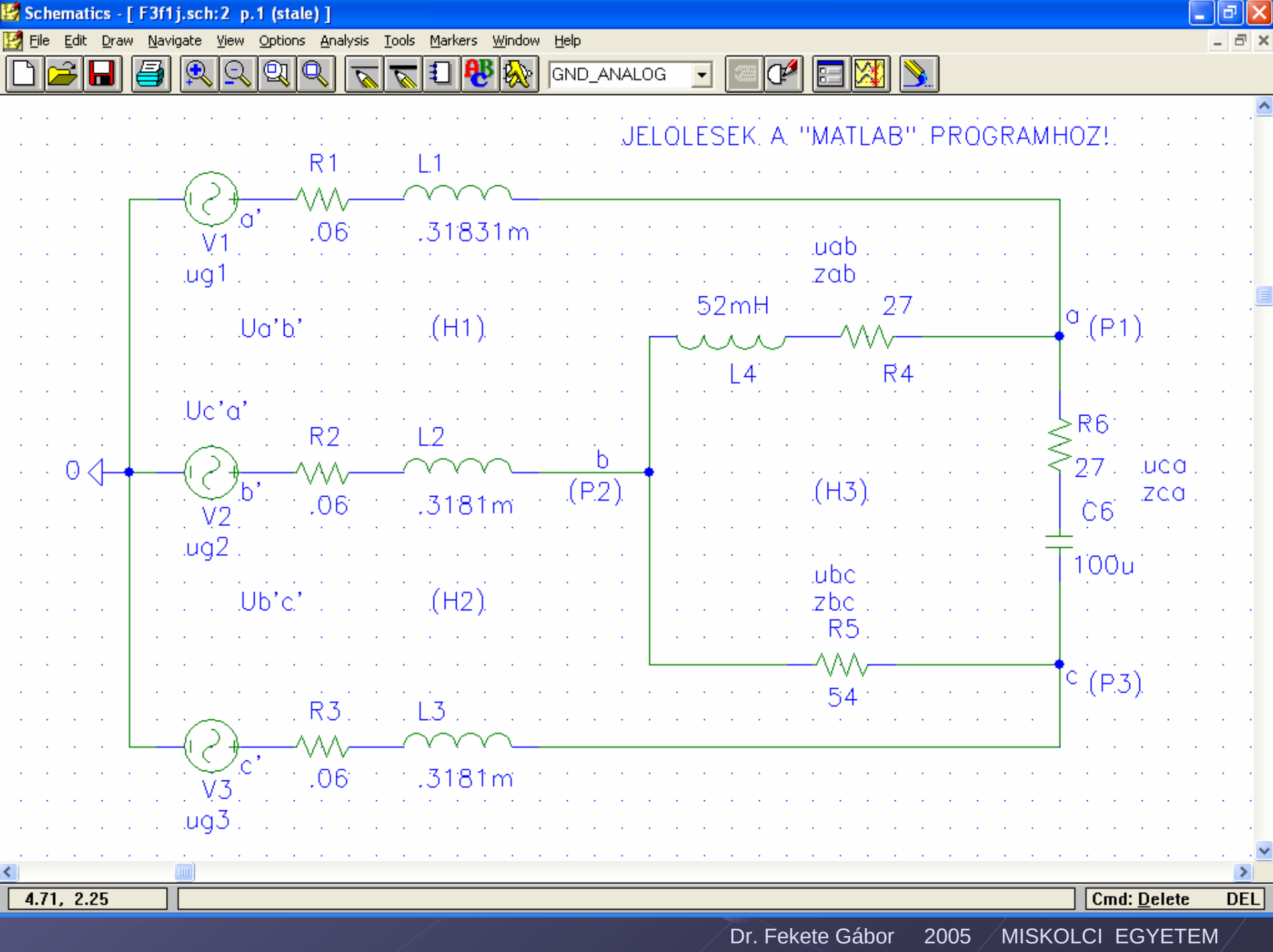
LABOR

Dr. Fekete Gábor 2005 MISKOLCI EGYETEM


Schematics - [*<new1> p.1]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
Part Browser Basic
Part Name:
R
Description:
resistor
R
R_var
RAM8Kx1br
RAM8Kx8br
Rbreak
readme
ROM32KX8
Sbreak
SIN
SOFTLIM
SQRT
STIM1
STIM16
STIM4
STIM8
SUM
Sw_tClose
Full List
Part Browser Basic
Part Name:
L
Description:
inductor
L
LAPLACE
Lbreak
LF411
LIB
LIMIT
LM111
LM324
LO
LOG
LOG10
LOPASS
male
MBD101
MbreakN
MbreakN3
MbreakN4
Full List
Part Browser Basic
Part Name:
C
Description:
Capacitor
C
C_var
Cbreak
CD4000_PW
CONST
COS
D1N4002
D1N4148
D1N750
DAC10break
DAC12break
DAC8break
DB25
DB25F
DB25F-B
DB25M
DB25M-B
Full List
Part Browser Basic
Part Name:
VSIN
Description:
Transient sine voltage source
VAC
VDC
VECTOR
VEXP
VIEWPOINT
VPLOT1
VPLOT2
VPRINT1
VPRINT2
VPULSE
VPWL
VPWL_ENH
VPWL_FILE
VSFFM
VSIN
VSRC
VSTIM
Full List
Part Browser Basic
Part Name:
GND_ANALOG
Description:
analog ground
G
GAIN
GFREQ
GLAPLACE
GLIMIT
GLOBAL
GMULT
GND_ANALOG
GND_EARTH
GPOLY
GSUM
GTABLE
GVALUE
H
HDR20
HDR50
HI
Close
Place
Place & Close
Help
Libraries...
Advanced >>
Full List
V1
V2
V3
0
R1
1k
R2
1k
R3
1k
R4
1k
R5
1k
R6
1k
L1
100H
L2
100H
L3
100H
L4
100H
1n
C1
3.29, 0.20
Cmd: Rotate


Schematics - [F3f1.sch p.1 (stale)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
R1 PartName: r
Name Value
VALUE = .06
Save Attr
Change Display
VALUE=.06
TOLERANCE=
L1 PartName: L
Name Value
VALUE = .31831m
Save Attr
Change Display
VALUE=.31831m
IC=
TOLERANCE=
C6 PartName: c
Name Value
VALUE = 100u
Save Attr
Change Display
Delete
VALUE=100u
IC=
TOLERANCE=
V1 PartName: VSIN
Name Value
VAMPL = 231
FREQ=50
PHASE=120
VOFF=0
AC=1
DC=
TD=0
DF=0
Include Non-changeable Attributes
Include System-defined Attributes
V2 PartName: VSIN
Name Value
VOFF = 0
VAMPL=231
FREQ=50
AC=1
DC=
TD=0
DF=0
PHASE=0
Include Non-changeable Attributes
Include System-defined Attributes
V3 PartName: VSIN
Name Value
VAMPL = 231
Save Attr
Change Display
Delete
VAMPL=231
FREQ=50
PHASE=240
VOFF=0
AC=1
DC=
TD=0
Include Non-changeable Attributes
Include System-defined Attributes
OK
Cancel
52mH
27
L4
R4
a
b
c
R6
27
C6
100u
4.81, 3.30
Page loaded.
Cmd:


Schematics - [F3f1.sch p.1 (stale)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
R1
L1
V1
.06
.31831m
52mH
27
a
L4
R4
R6
27
C6
100u
R2
L2
0
b
V2
.06
.3181m
R5
54
c
R3
L3
V3
.06
.3181m
3.05, 2.46
Cmd:


Schematics - [F3f1j.sch:2 p.1 (stale)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
JELOLESEK A "MATLAB" PROGRAMHOZ!
R1
L1
a'
V1
ug1
.06
.31831m
Ua'b'
(H1)
uab
zab
52mH
27
a
(P1)
L4
R4
Uc'a'
R6
R2
L2
b
27
uca
zca
0
b'
V2
ug2
.06
.3181m
(P2)
(H3)
C6
100u
Ub'c'
(H2)
ubc
zbc
R5
54
c
(P3)
R3
L3
c'
V3
ug3
.06
.3181m
4.71, 2.25
Cmd: Delete DEL
Dr. Fekete Gábor 2005 MISKOLCI EGYETEM

F3f1 - Jegyzettömb

Fájl Szerkesztés Formátum Nézet Súgó

```
clear;clc; format compact; close all;
disp(' ');
disp('              A   H Á R O M F Á Z I S Ú   F E L A D A T          ');
disp('         A generátor csillag, a fogyasztó delta kapcsolású       ');
disp(' ');

% kiindulasi adatok
ug=231;ug1=ug*exp(j*2*pi/3);ug2=ug;ug3=ug*exp(j*4*pi/3);f=50;w=2*pi*f;
zgv=.06+.1*j;L=.052;C=100e-6;R=27;zab=R+j*w*L;zbc=2*R;zca=R+1/(j*w*C);

disp(' ');
disp(' A hurokáramok módszerével az ágáramok [A] ');
disp(' ');

z=[2*zgv+zab    -zgv     -zab
    -zgv      2*zgv+zbc  -zbc
    -zab        -zbc   zab+zbc+zca];
u=[ug1-ug2;ug2-ug3;0]; % A pontosvessző ; oszlopvektort eredményez!
h=inv(z)*u;
iab=h(1)-h(3);ibc=h(2)-h(3);ica=-h(3);%a fázisáramok
ia=h(1);ib=h(2)-h(1);ic=-h(2);%a vonaláramok
uab=iab*zab;ubc=ibc*zbc;uca=ica*zca;%a fogyasztó fázis- és vonalfeszültségei
ifh=[iab;ibc;ica]
ifhabs=abs(ifh)
ivh=[ia;ib;ic]
ivhabs=abs(ivh)

disp(' ');disp(' ');
disp(' A csomóponti potenciálok módszerével az ágáramok [A] ');
disp(' ');

y=[1/zgv+1/zca+1/zab    -1/zab        -1/zca
     -1/zab      1/zgv+1/zab+1/zbc    -1/zbc
     -1/zca             -1/zbc     1/zgv+1/zbc+1/zca];
i=[ug1/zgv;ug2/zgv;ug3/zgv];
up=inv(y)*i;
ifp=[(up(1)-up(2))/zab;(up(2)-up(3))/zbc;(up(3)-up(1))/zca]
ifpabs=abs(ifp)
ivp=[(ug1-up(1))/zgv;(ug2-up(2))/zgv;(ug3-up(3))/zgv]
ivpabs=abs(ivp)

% fazorábrák

Uab=ug1-ug2; Ubc=ug2-ug3; Uca=ug3-ug1;
Ugfv=[ug1;ug2;ug3;Uab;Ubc;Uca;uab;ubc;uca];
figure;
compass(Ugfv)
text(real(ug1),imag(ug1),'ug1');text(real(ug2),imag(ug2),'ug2');
text(real(ug3),imag(ug3),'ug3');text(real(Uab),imag(Uab),'Uab');
text(real(Ubc),imag(Ubc),'Ubc');text(real(Uca),imag(Uca),'Uca');
```

F3f1 - Jegyzettömb

Fájl Szerkesztés Formátum Nézet Súgó

```
% fazorábrák

Uab=Ug1-Ug2; Ubc=Ug2-Ug3; Uca=Ug3-Ug1;
Ugfv=[Ug1;Ug2;Ug3;Uab;Ubc;Uca;uab;ubc;uca];
figure;
compass(Ugfv)
text(real(Ug1),imag(Ug1),'Ug1');text(real(Ug2),imag(Ug2),'Ug2');
text(real(Ug3),imag(Ug3),'Ug3');text(real(Uab),imag(Uab),'Uab');
text(real(Ubc),imag(Ubc),'Ubc');text(real(Uca),imag(Uca),'Uca');
text(real(uab),imag(uab),'uab');text(real(ubc),imag(ubc),'ubc');
text(real(uca),imag(uca),'uca');
title('A generátor fázis és vonali-, továbbá a fogyasztó fázis- feszültsége [V]');
zoom on;
grid on;

fazorv=[uab/20;ubc/20;uca/20;ia;ib;ic];
figure;
compass(fazorv);
text(real(uab/20),imag(uab/20),'uab/20');text(real(ubc/20),imag(ubc/20),'ubc/20');
text(real(uca/20),imag(uca/20),'uca/20');
text(real(ia),imag(ia),'ia');text(real(ib),imag(ib),'ib');
text(real(ic),imag(ic),'ic');
title('A vonali feszültségek [V] és áramok [A] a fogyasztóra');
zoom on;
grid on;

fazorf=[uab/20;ubc/20;uca/20;iab;ibc;ica];
figure;
compass(fazorf);
text(real(uab/20),imag(uab/20),'uab/20');text(real(ubc/20),imag(ubc/20),'ubc/20');
text(real(uca/20),imag(uca/20),'uca/20');
text(real(iab),imag(iab),'iab');text(real(ibc),imag(ibc),'ibc');
text(real(ica),imag(ica),'ica');
title('A fázis feszültségek [V] és áramok [A] a fogyasztóra');
zoom on;
grid on;

% további eredmények

disp(' ');disp(' ');
disp(' A fogyasztó fázis feszültsége [V] ');
disp(' ');
uf=[uab;ubc;uca]
ufabs=abs(uf)

disp(' ');disp(' ');
disp(' A generátor fázis feszültsége [V] ');
disp(' ');
ugf=[Ug1;Ug2;Ug3]
```

F3f1 - Jegyzettömb

Fájl Szerkesztés Formátum Nézet Súgó

```
zoom on;
grid on;

% további eredmények

disp(' ');disp(' ');
disp(' A fogyasztó fázis feszültsége [V] ');
disp(' ');
uf=[uab;ubc;uca]
ufabs=abs(uf)

disp(' ');disp(' ');
disp(' A generátor fázis feszültsége [V] ');
disp(' ');
ugf=[ug1;ug2;ug3]
ugfabs=abs(ugf)

disp(' ');disp(' ');
disp(' A generátor vonali feszültsége [V] ');
disp(' ');
Ugv=[Uab;Ubc;Uca]
Ugvabs=abs(Ugv)

disp(' ');disp(' ');
disp(' A generátor vonali feszültségének időeltolása a fázis feszültségéhez képest [s] (késés = +) ');
disp(' ');
Tfv=[(angle(ug1)-angle(Uab))/2/pi/f;(angle(ug2)-angle(Ubc))/2/pi/f;(angle(ug3)-angle(Uca))/2/pi/f]

disp(' ');disp(' ');
disp(' A fugyasztó feszültségének időeltolása a generátor vonali feszültségéhez képest [s] (késés = +) ');
disp(' ');
Tvv=[(angle(Uab)-angle(uab))/2/pi/f;(angle(Ubc)-angle(ubc))/2/pi/f;(angle(Uca)-angle(uca))/2/pi/f]

disp(' ');disp(' ');
disp(' A fugyasztó vonali áramának időeltolása a feszültségéhez képest [s] (késés = +) ');
disp(' ');
Tiv=[(angle(uab)-angle(ia))/2/pi/f;(angle(ubc)-angle(ib))/2/pi/f;(angle(uca)-angle(ic))/2/pi/f]

disp(' ');disp(' ');
disp(' A fugyasztó fázis áramának időeltolása a feszültségéhez képest [s] (késés = +) ');
disp(' ');
Tif=[(angle(uab)-angle(iab))/2/pi/f;(angle(ubc)-angle(ibc))/2/pi/f;(angle(uca)-angle(ica))/2/pi/f]

disp(' ');disp(' ');
disp(' A teljesítmények [w] ');
disp(' ');
Pfogy=((abs(iab)^2)*R+(abs(ibc)^2)*2*R+(abs(ica)^2)*R)/2    % "/2" a csúcsértékek miatt!
Pveszt=(real(zgv)*((abs(ia)^2)+(abs(ib)^2)+(abs(ic)^2)))/2  % "/2" a csúcsértékek miatt!
PR=Pfogy+Pveszt
Pg=-(real(ug1*(conj(ia))+ug2*(conj(ib))+ug3*(conj(ic))))/2  % "/2" a csúcsértékek miatt!
```

MATLAB Command Window

File Edit Options Windows Help

```
» f3f1

            A   H Á R O M F Á Z I S Ú   F E L A D A T
        A generátor csillag, a fogyasztó delta kapcsolású


 A hurokáramok módszerével az ágáramok [A]

ifh =
  -5.9862 +11.0712i
   6.4086 + 3.6804i
   7.2505 - 6.2623i
ifhabs =
   12.5860
    7.3902
    9.5806
ivh =
 -13.2367 +17.3336i
  12.3947 - 7.3908i
   0.8420 - 9.9428i
ivhabs =
   21.8097
   14.4310
    9.9784


 A csomóponti potenciálok módszerével az ágáramok [A]

ifp =
  -5.9862 +11.0712i
   6.4086 + 3.6804i
   7.2505 - 6.2623i
ifpabs =
   12.5860
    7.3902
    9.5806
ivp =
 -13.2367 +17.3336i
  12.3947 - 7.3908i
   0.8420 - 9.9428i
ivpabs =
   21.8097
   14.4310
    9.9784
```

MATLAB Command Window

File Edit Options Windows Help

```
 A fogyasztó fázis feszültsége [V]

uf =
  1.0e+002 *
  -3.4249 + 2.0113i
   3.4606 + 1.9874i
  -0.0357 - 3.9988i
ufabs =
  397.1814
  399.0713
  399.8910


 A generátor fázis feszültsége [V]

ugf =
  1.0e+002 *
  -1.1550 + 2.0005i
   2.3100
  -1.1550 - 2.0005i
ugfabs =
  231.0000
  231.0000
  231.0000


 A generátor vonali feszültsége [V]

Ugv =
  1.0e+002 *
  -3.4650 + 2.0005i
   3.4650 + 2.0005i
   0.0000 - 4.0010i
Ugvabs =
  400.1037
  400.1037
  400.1037


 A generátor vonali feszültségének időeltolása a fázis feszültségéhez képest [s] (késés = +)

Tfv =
```

MATLAB Command Window

File Edit Options Windows Help

```
 A generátor vonali feszültségének időeltolása a fázis feszültségéhez képest [s] (késés = +)

Tfv =
   -0.0017
   -0.0017
   -0.0017


 A fugyasztó feszültségének időeltolása a generátor vonali feszültségéhez képest [s] (késés = +)

Tvv =
  1.0e-004 *
    0.2356
    0.0729
    0.2844


 A fugyasztó vonali áramának időeltolása a feszültségéhez képest [s] (késés = +)

Tiv =
    0.0012
    0.0034
   -0.0003


 A fugyasztó fázis áramának időeltolása a feszültségéhez képest [s] (késés = +)

Tif =
    0.0017
         0
   -0.0028


 A teljesítmények [W]

Pfogy =
  4.8522e+003
Pveszt =
   23.5046
PR =
  4.8757e+003
Pg =
 -4.8757e+003
»
```

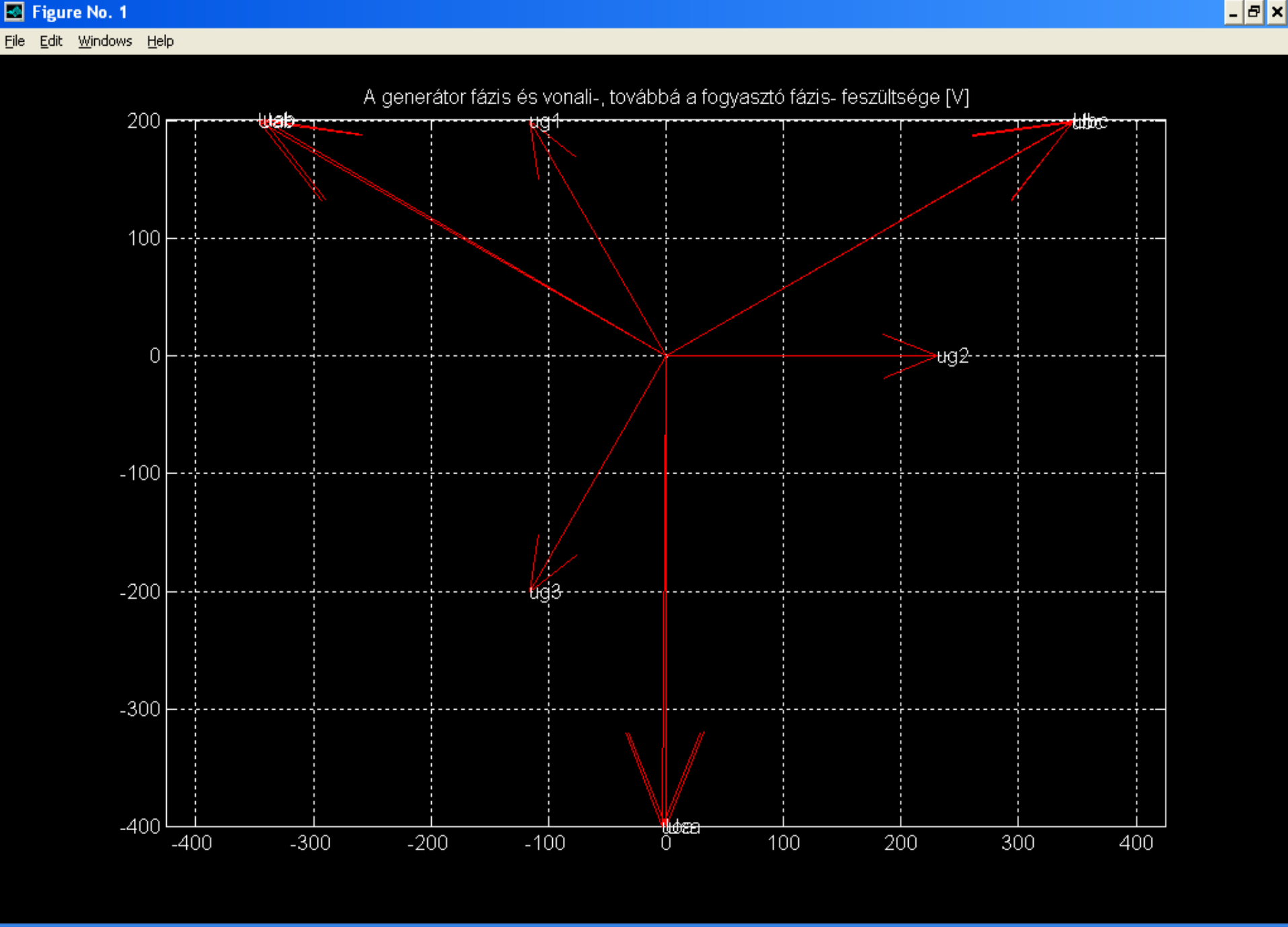


Figure No. 1
File Edit Windows Help
A generátor fázis és vonali-, továbbá a fogyasztó fázis- feszültsége [V]
ug1
ug2
ug3
200
100
0
-100
-200
-300
-400
-400
-300
-200
-100
0
100
200
300
400

Figure No. 1

File Edit Windows Help

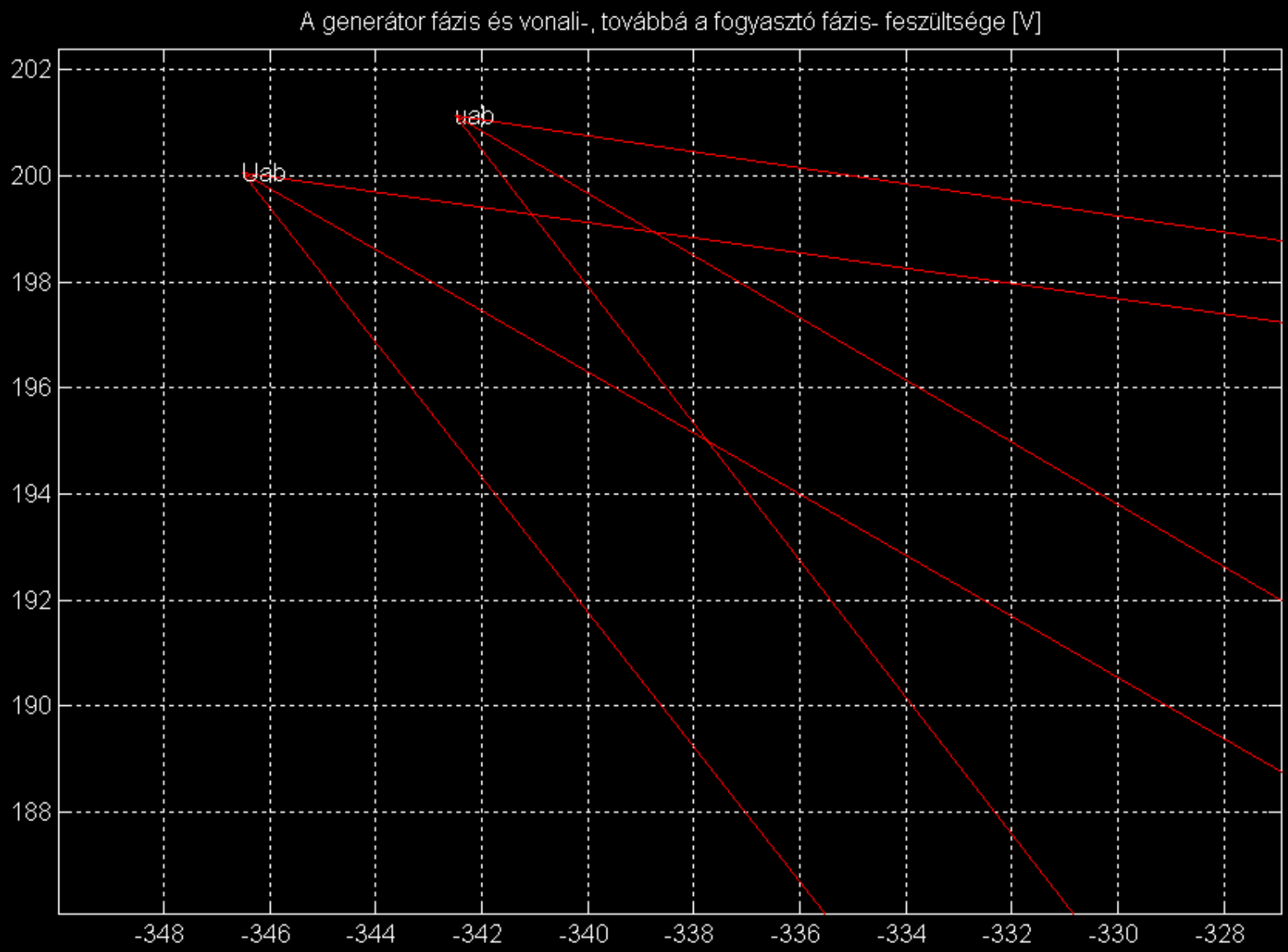
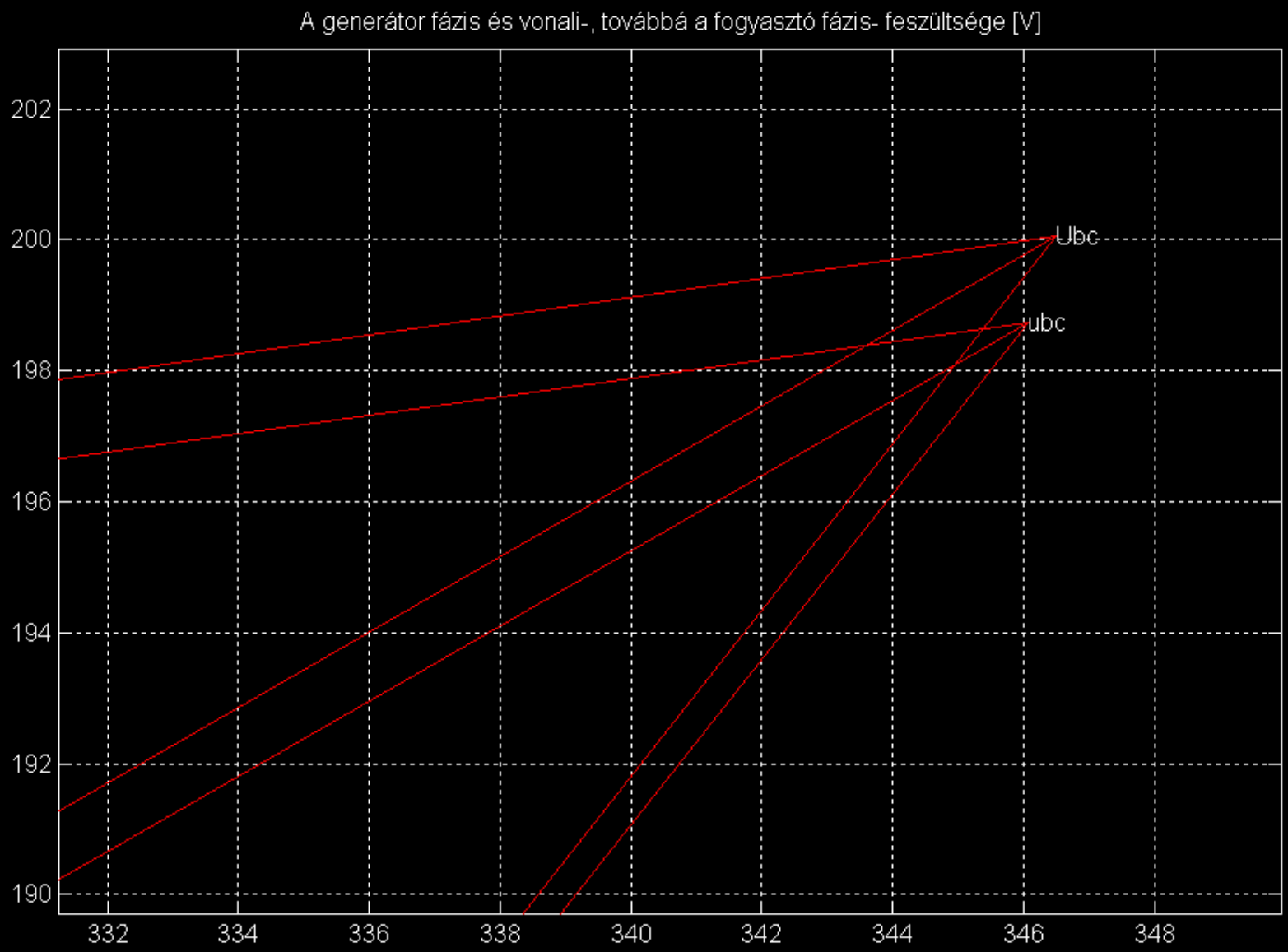


Figure No. 1

File Edit Windows Help



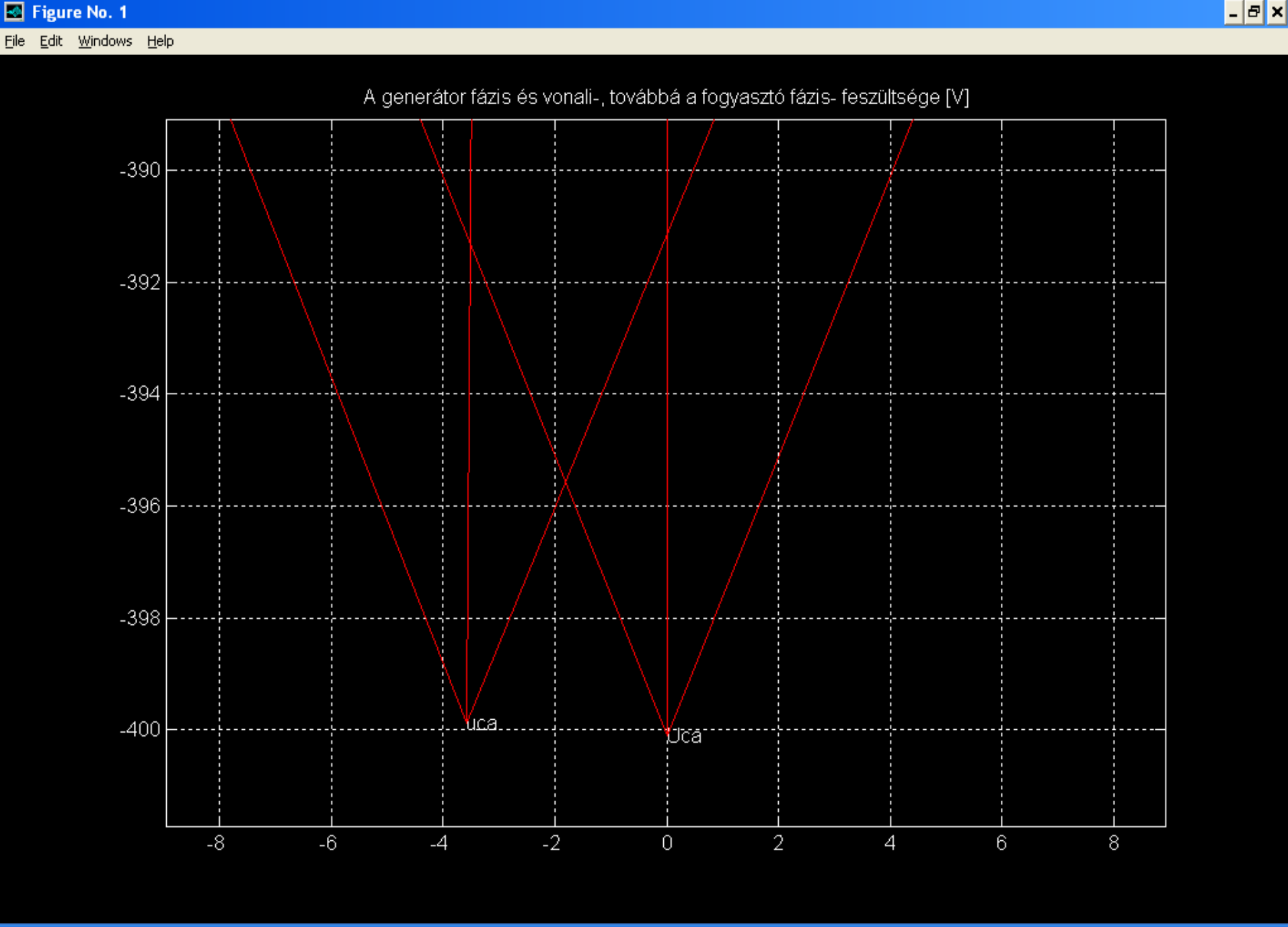


Figure No. 1
File Edit Windows Help
A generátor fázis és vonali-, továbbá a fogyasztó fázis- feszültsége [V]
-390
-392
-394
-396
-398
-400
-8
-6
-4
-2
0
2
4
6
8
uca
Uca

Figure No. 2

File Edit Windows Help

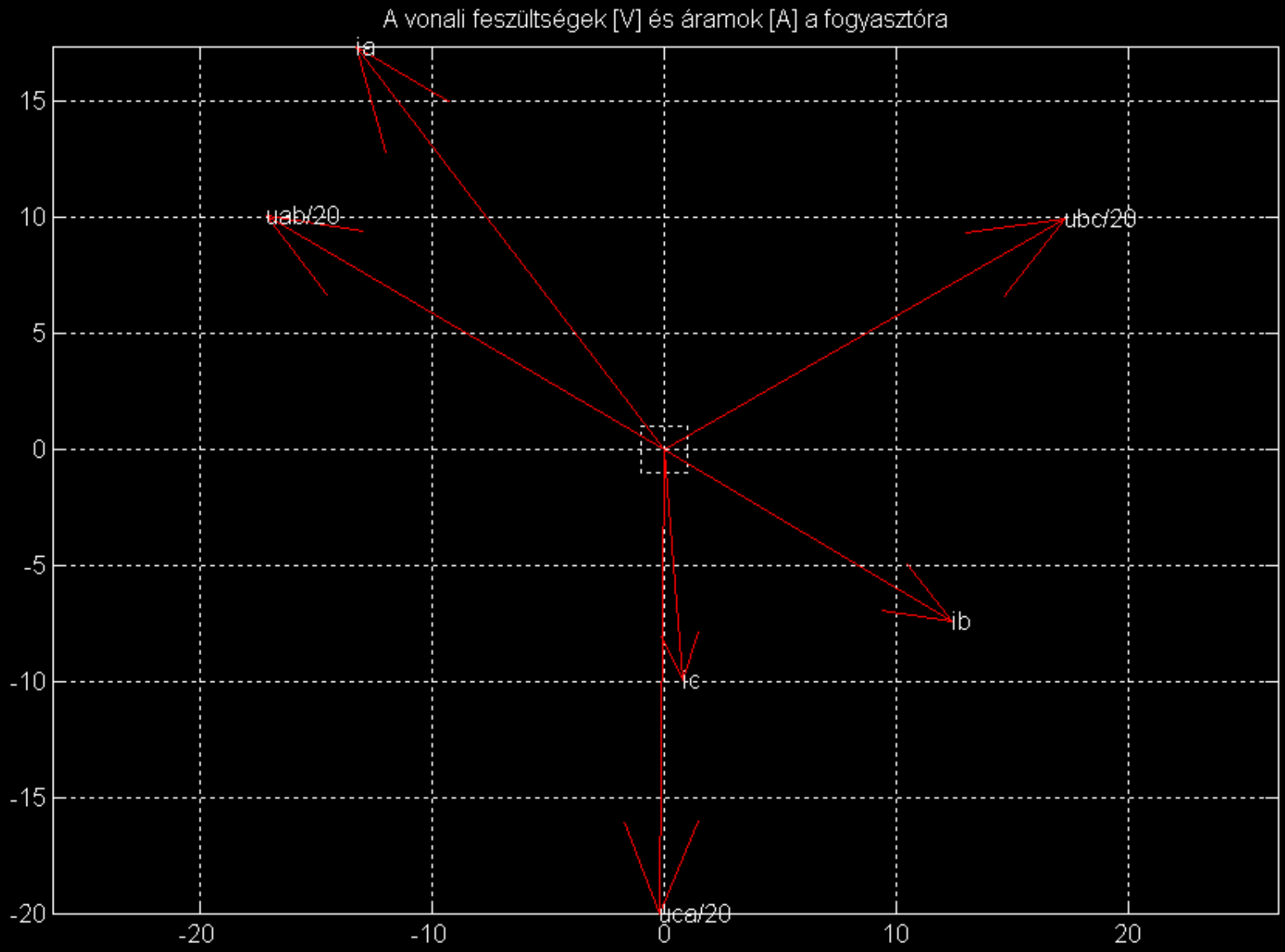
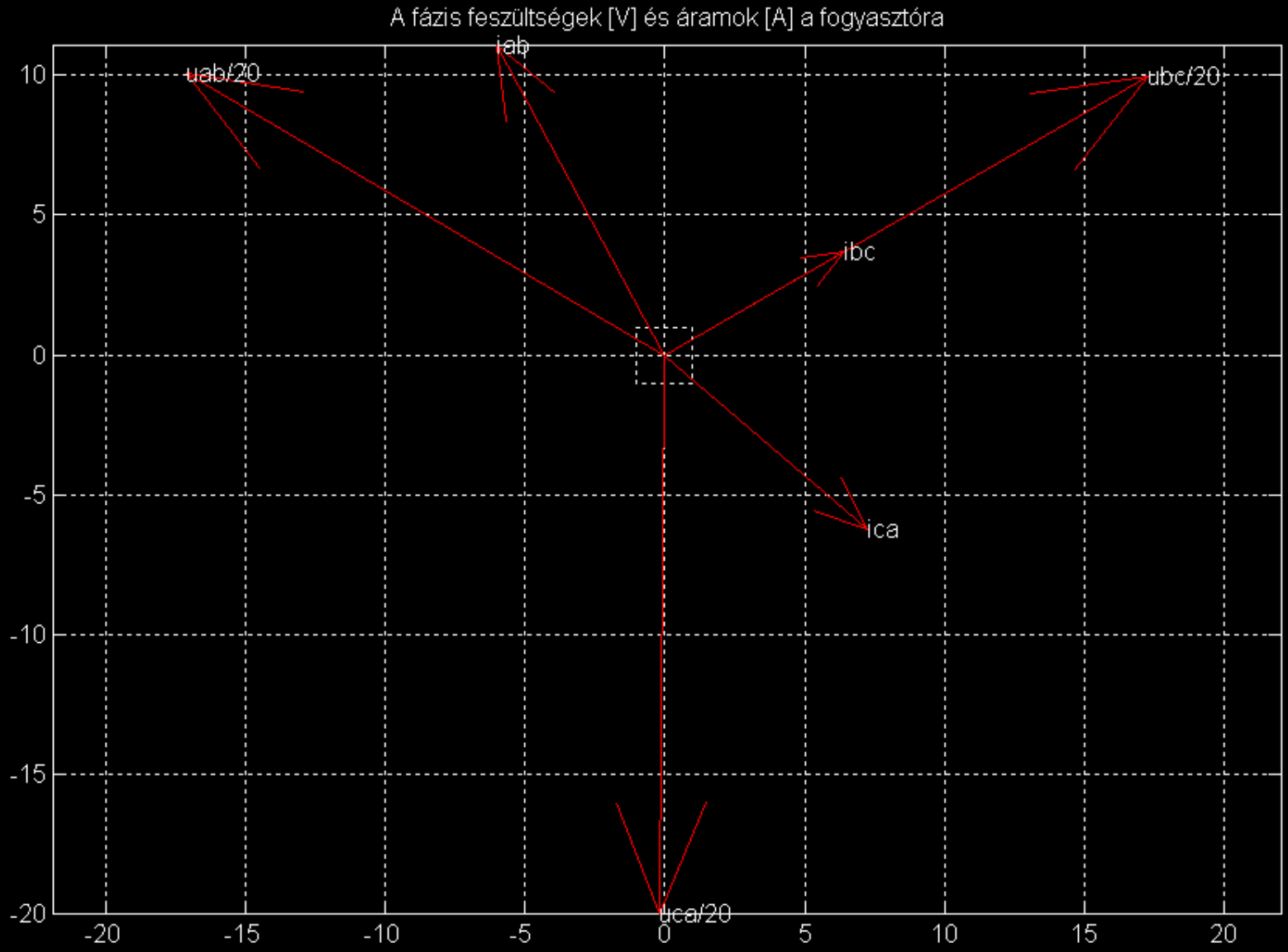
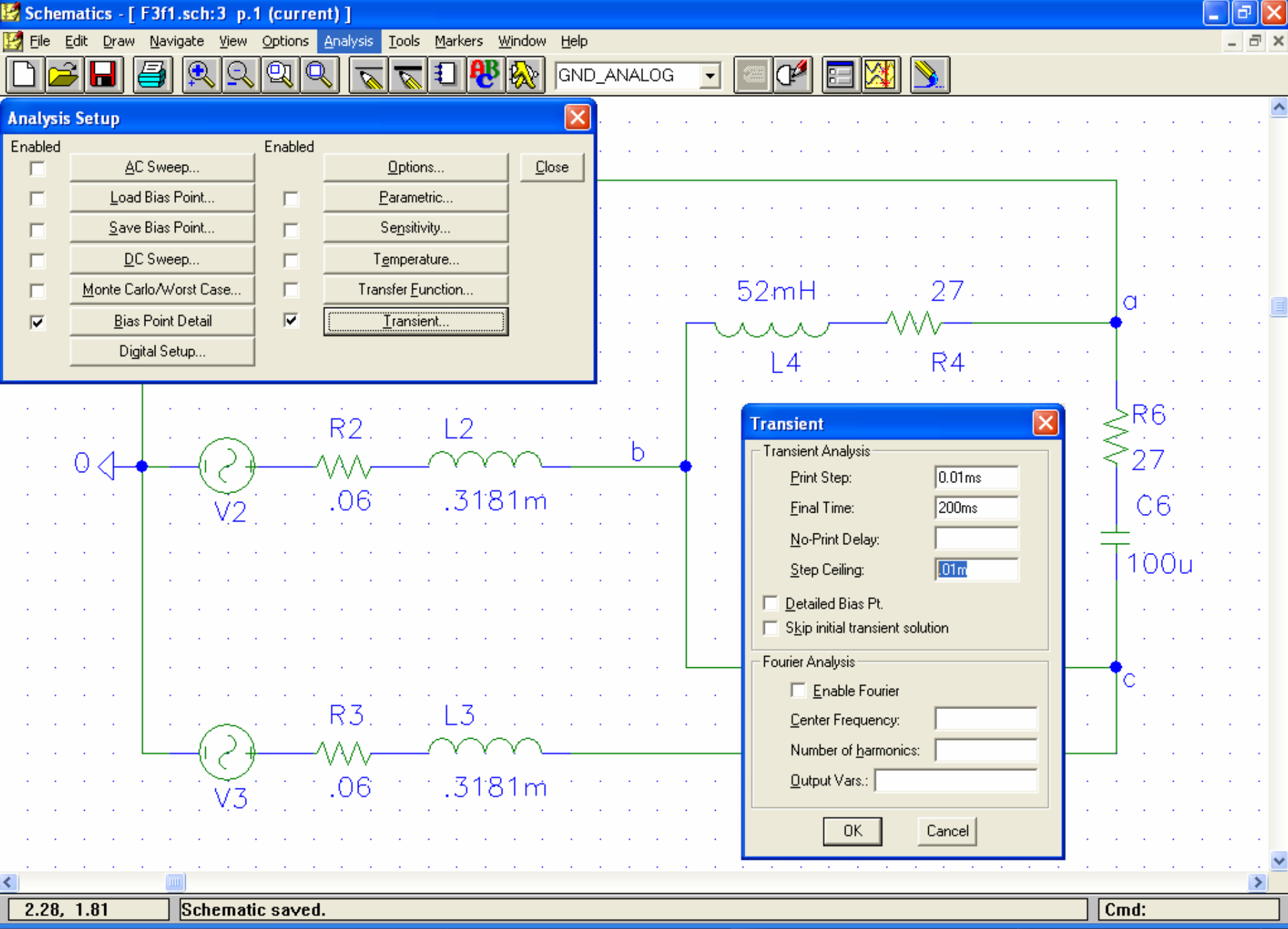
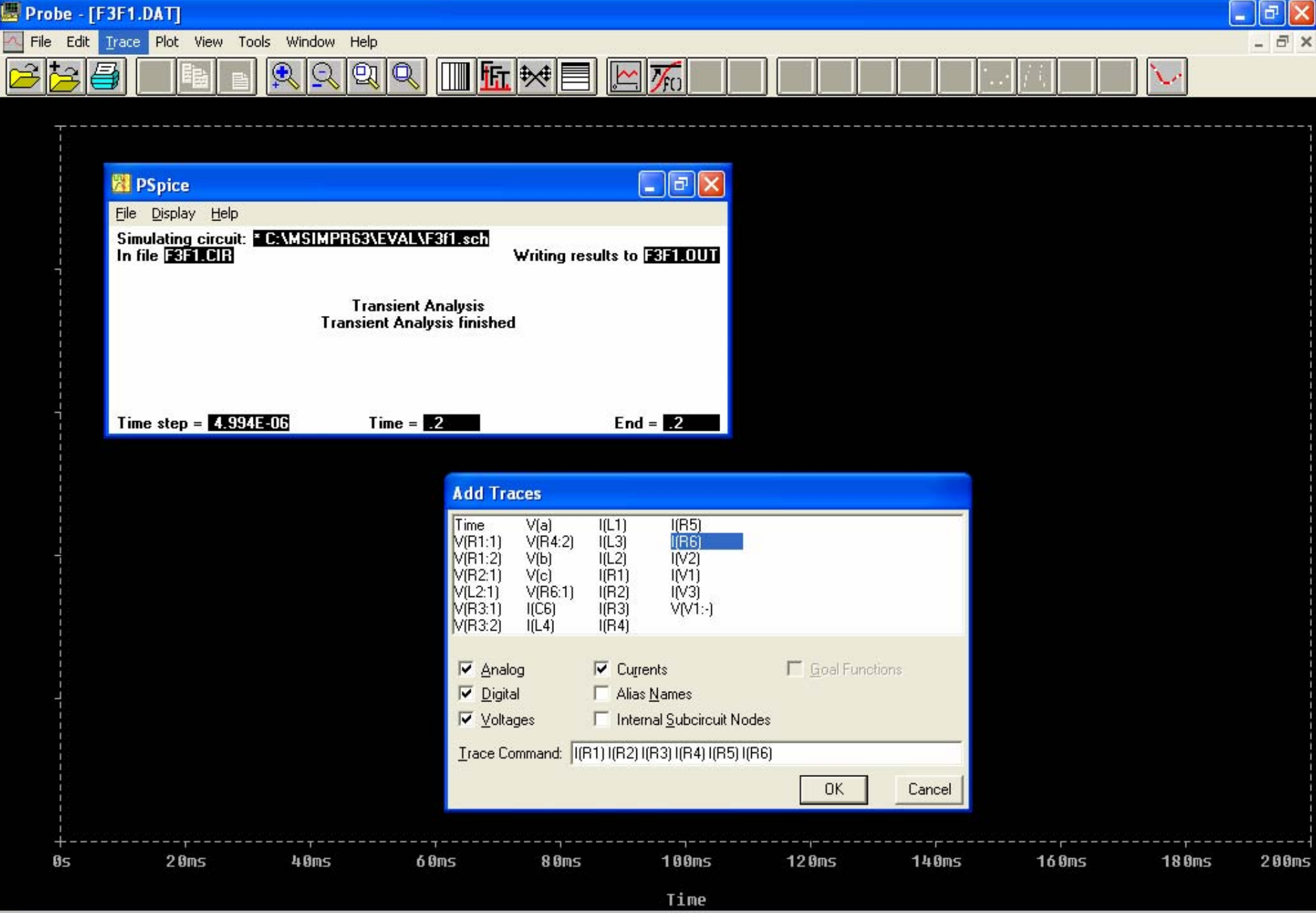


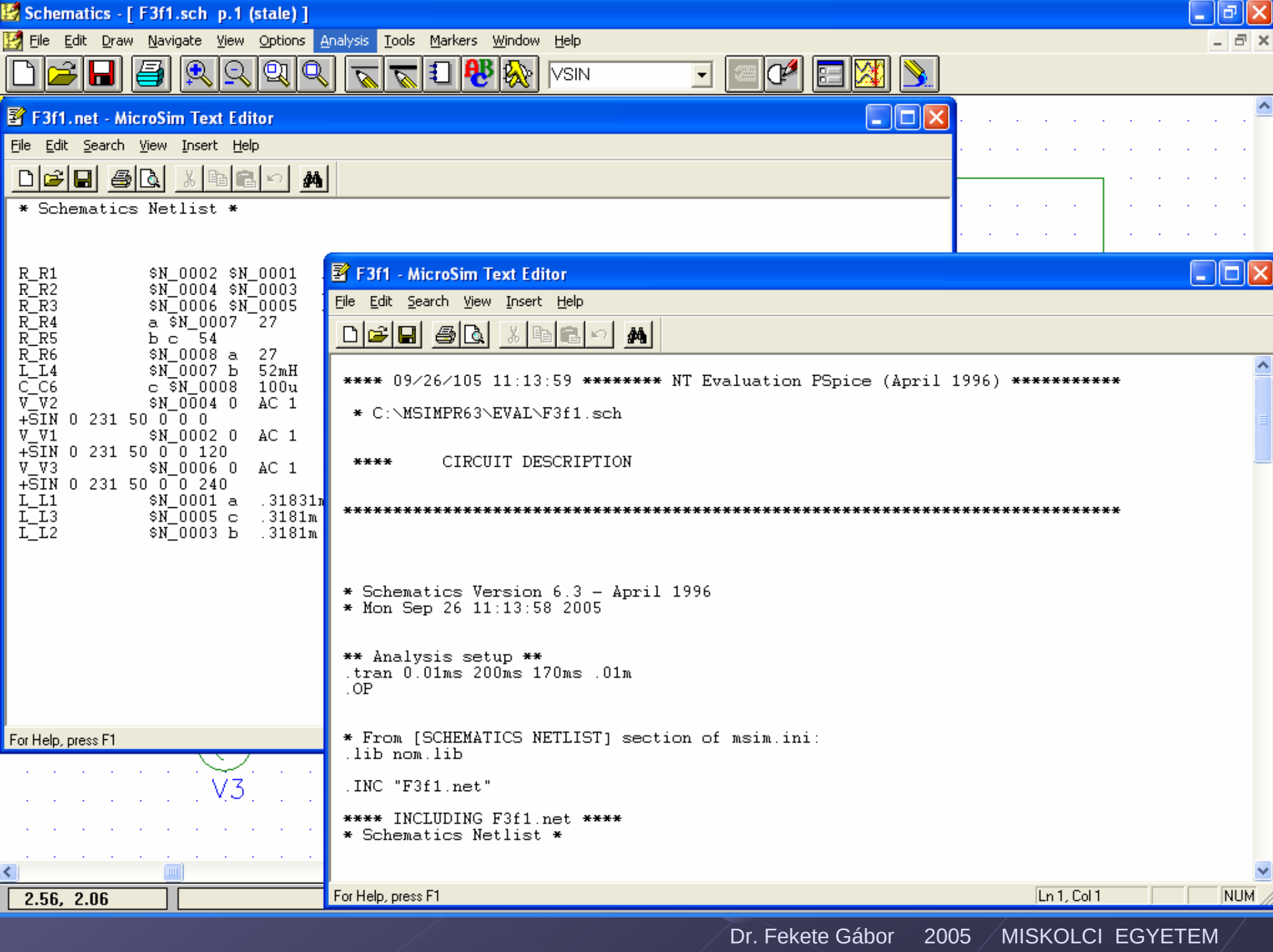
Figure No. 3

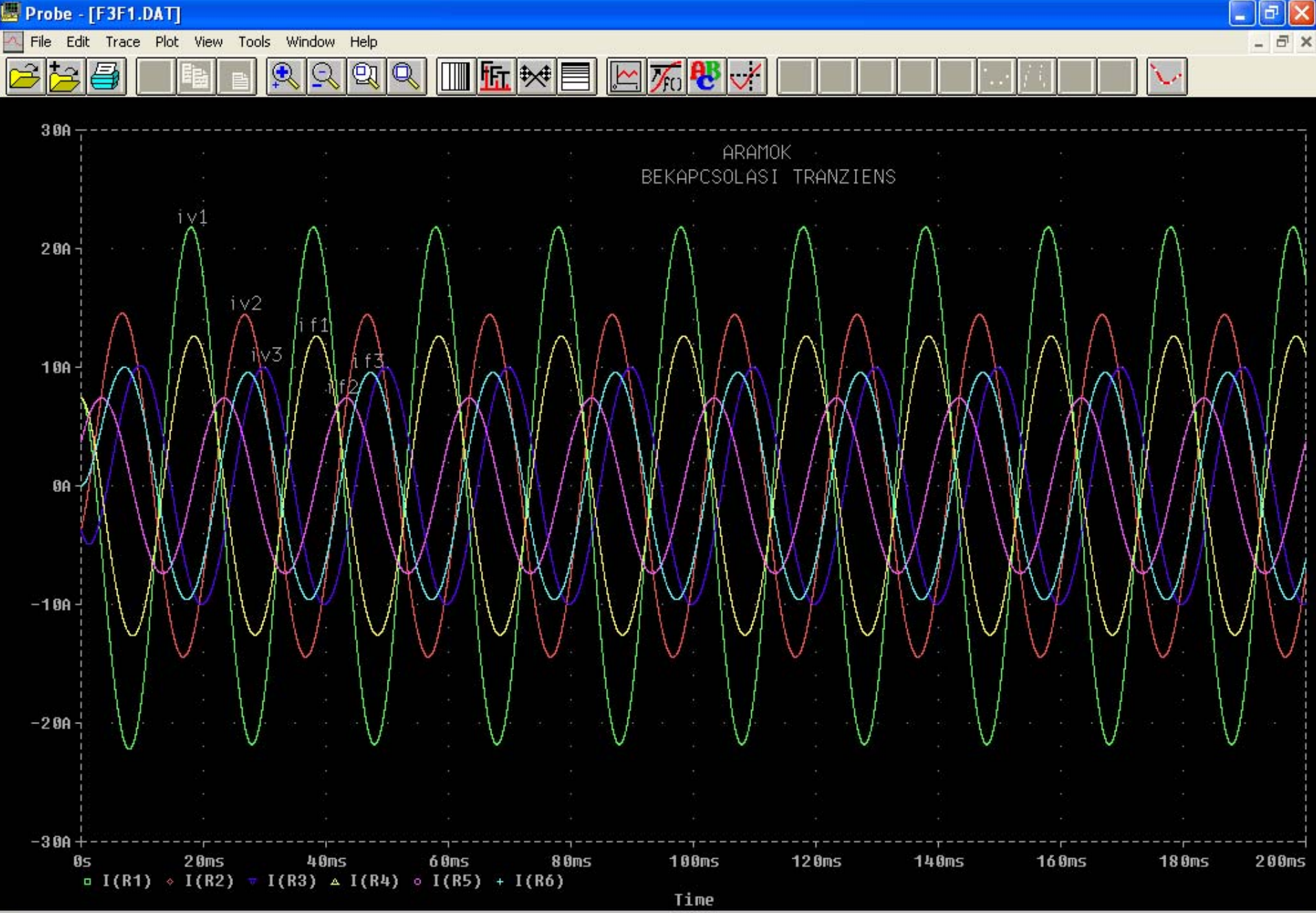
File Edit Windows Help

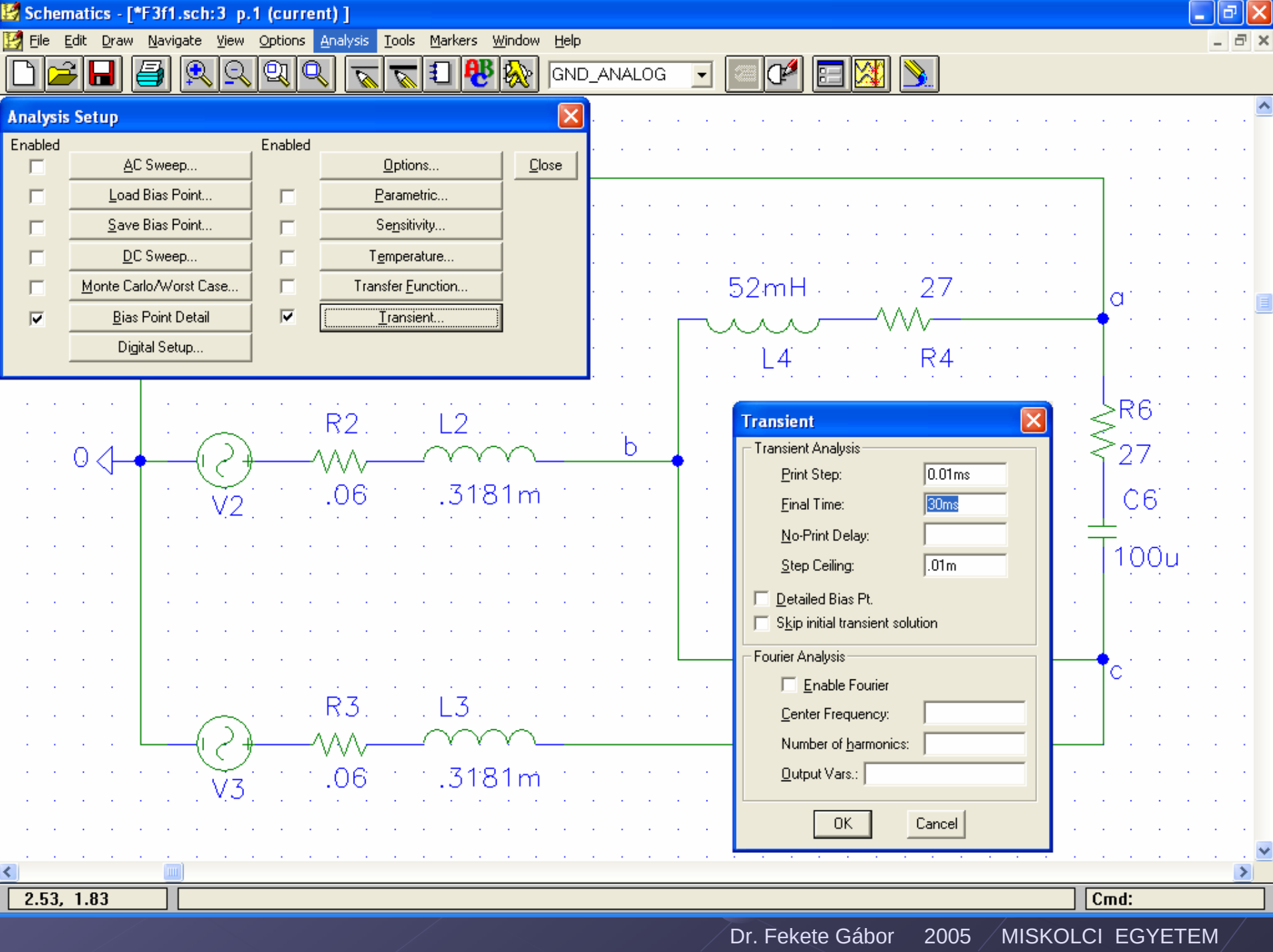


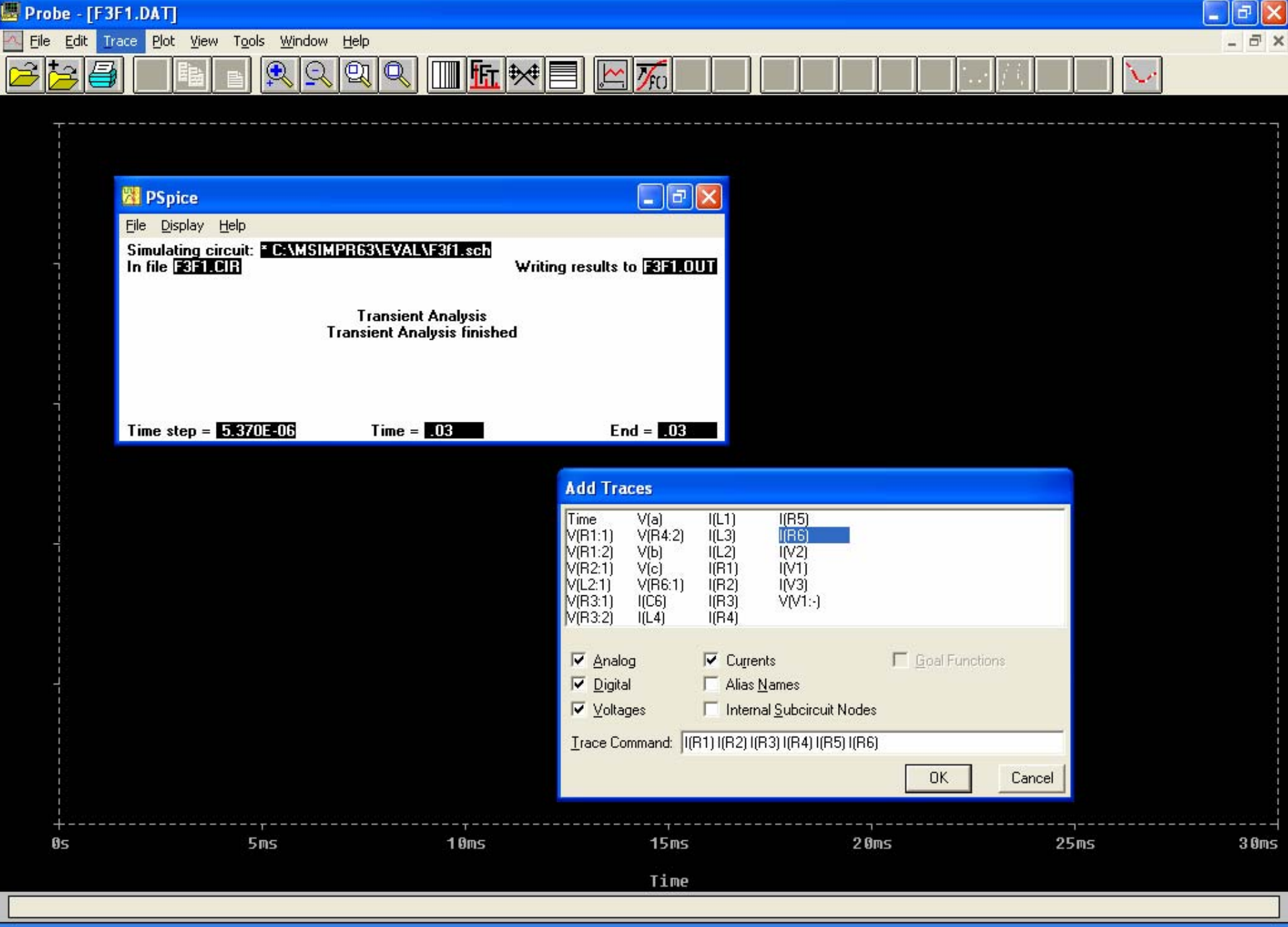

Schematics - [F3f1.sch:3 p.1 (current)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
Analysis Setup
Enabled
AC Sweep...
Load Bias Point...
Save Bias Point...
DC Sweep...
Monte Carlo/Worst Case...
Bias Point Detail
Digital Setup...
Enabled
Options...
Parametric...
Sensitivity...
Temperature...
Transfer Function...
Transient...
Close
52mH
L4
27
R4
a
R6
27
C6
100u
c
0
V2
R2
.06
L2
.3181m
b
V3
R3
.06
L3
.3181m
Transient
Transient Analysis
Print Step: 0.01ms
Final Time: 200ms
No-Print Delay:
Step Ceiling: 01m
Detailed Bias Pt.
Skip initial transient solution
Fourier Analysis
Enable Fourier
Center Frequency:
Number of harmonics:
Output Vars.:
OK
Cancel
2.28, 1.81
Schematic saved.
Cmd:

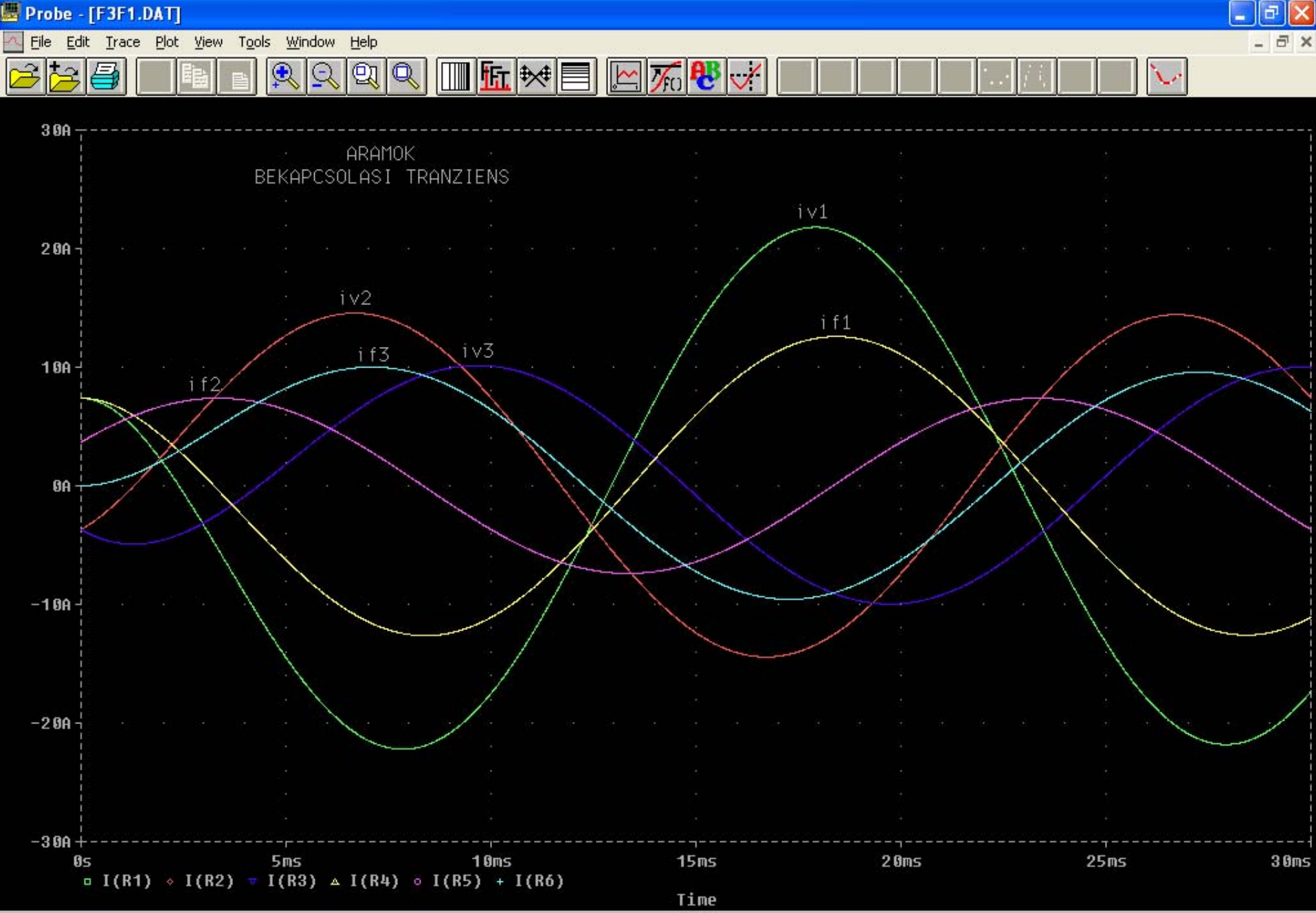

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 4.994E-06
Time = .2
End = .2
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: I(R1) I(R2) I(R3) I(R4) I(R5) I(R6)
OK
Cancel
0s 20ms 40ms 60ms 80ms 100ms 120ms 140ms 160ms 180ms 200ms
Time

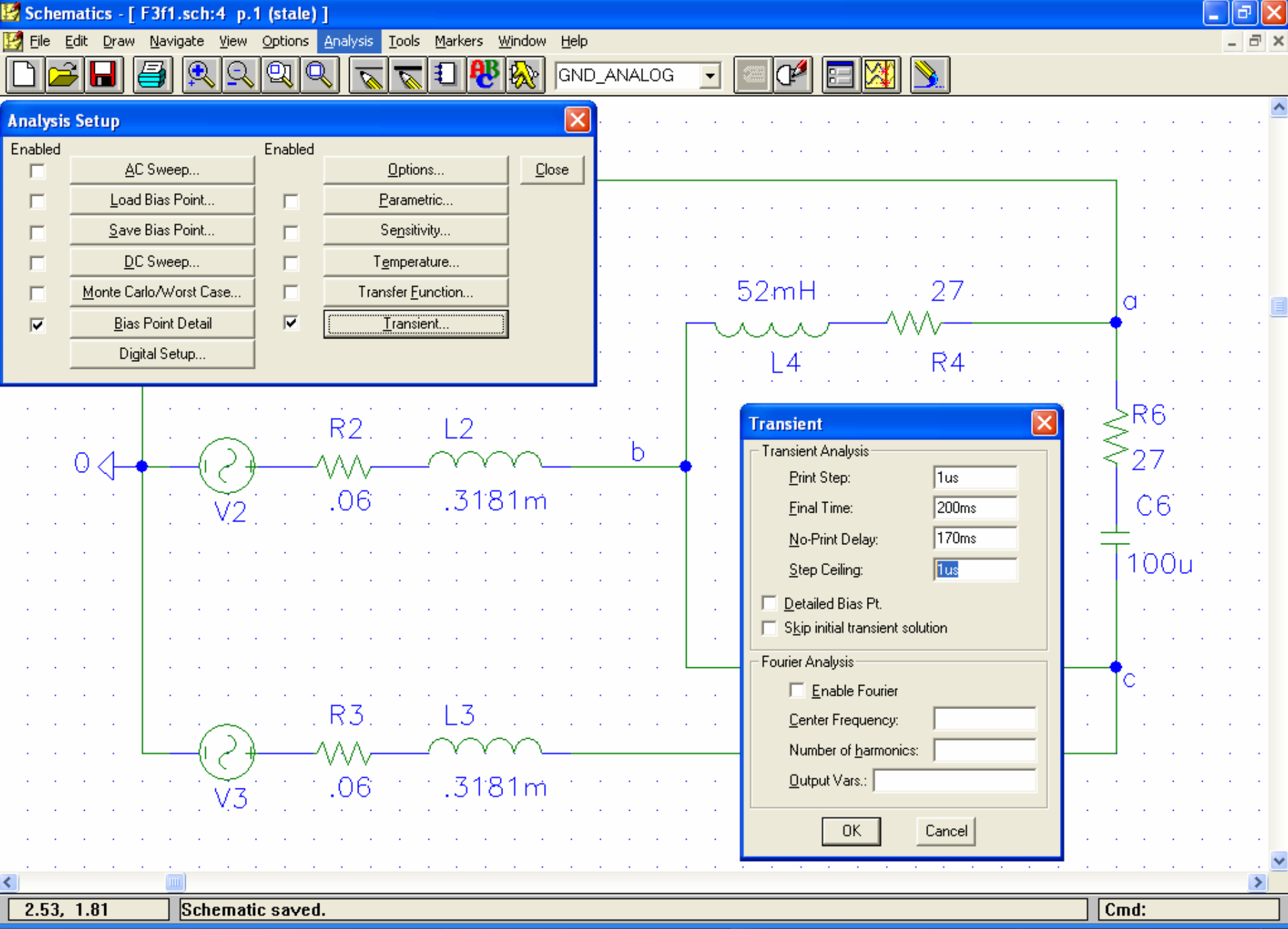

Schematics - [F3f1.sch p.1 (stale)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
VSIN
F3f1.net - MicroSim Text Editor
File Edit Search View Insert Help
* Schematics Netlist *
R_R1 $N_0002 $N_0001
R_R2 $N_0004 $N_0003
R_R3 $N_0006 $N_0005
R_R4 a $N_0007 27
R_R5 b c 54
R_R6 $N_0008 a 27
L_L4 $N_0007 b 52mH
C_C6 c $N_0008 100u
V_V2 $N_0004 0 AC 1
+SIN 0 231 50 0 0 0
V_V1 $N_0002 0 AC 1
+SIN 0 231 50 0 0 120
V_V3 $N_0006 0 AC 1
+SIN 0 231 50 0 0 240
L_L1 $N_0001 a .31831m
L_L3 $N_0005 c .3181m
L_L2 $N_0003 b .3181m
For Help, press F1
F3f1 - MicroSim Text Editor
File Edit Search View Insert Help
**** 09/26/105 11:13:59 ******** NT Evaluation PSpice (April 1996) ***********
* C:\MSIMPR63\EVAL\F3f1.sch
**** CIRCUIT DESCRIPTION
****
* Schematics Version 6.3 - April 1996
* Mon Sep 26 11:13:58 2005
** Analysis setup **
.tran 0.01ms 200ms 170ms .01m
.OP
* From [SCHEMATICS NETLIST] section of msim.ini:
.lib nom.lib
.INC "F3f1.net"
**** INCLUDING F3f1.net ****
* Schematics Netlist *
For Help, press F1
Ln 1, Col 1
NUM
V3
2.56, 2.06

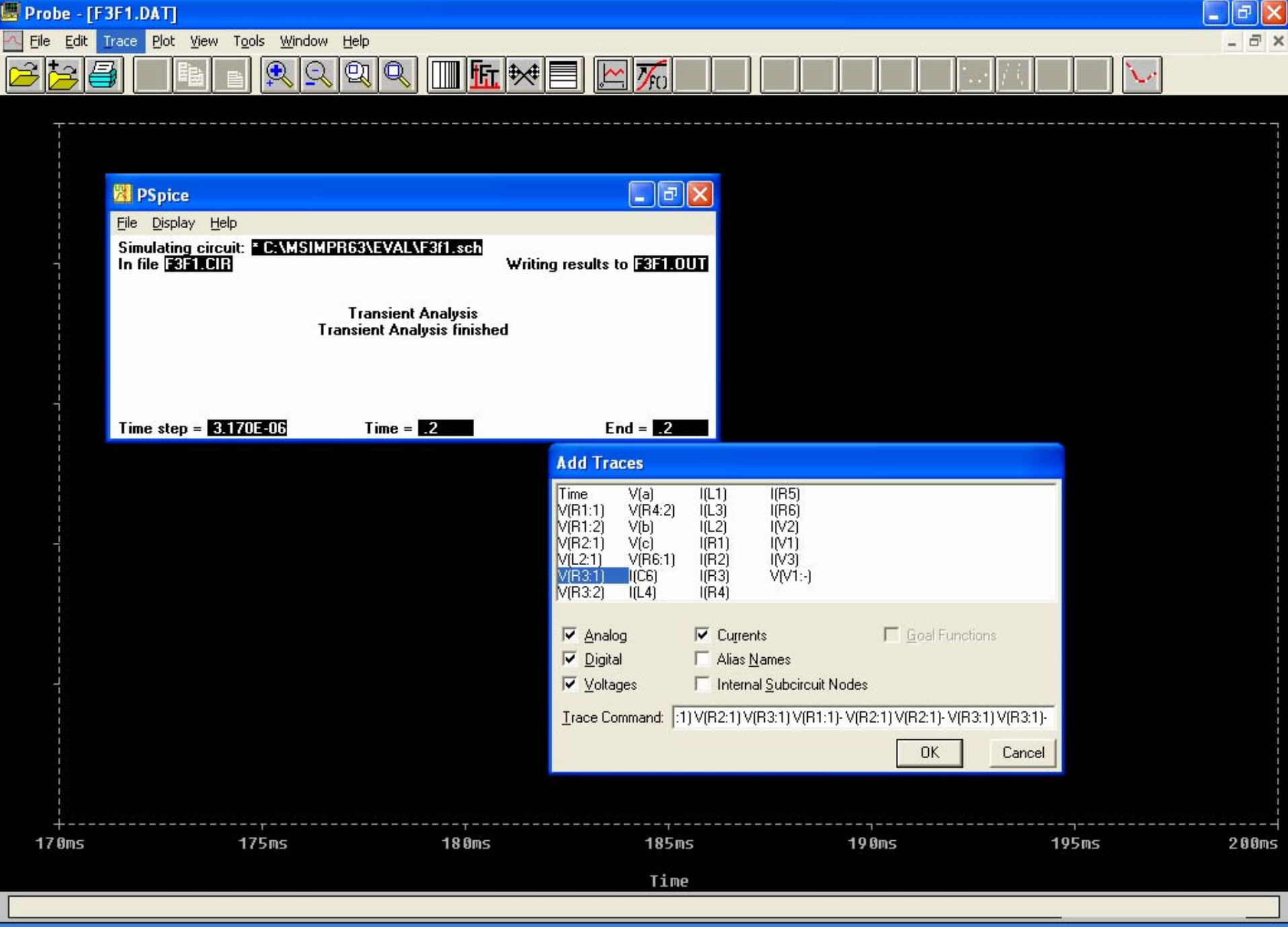

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
ARAMOK
BEKAPCSOLASI TRANZIENS
iv1
iv2
iv3
if1
if2
if3
30A
20A
10A
0A
-10A
-20A
-30A
0s
20ms
40ms
60ms
80ms
100ms
120ms
140ms
160ms
180ms
200ms
I(R1) I(R2) I(R3) I(R4) I(R5) I(R6)
Time

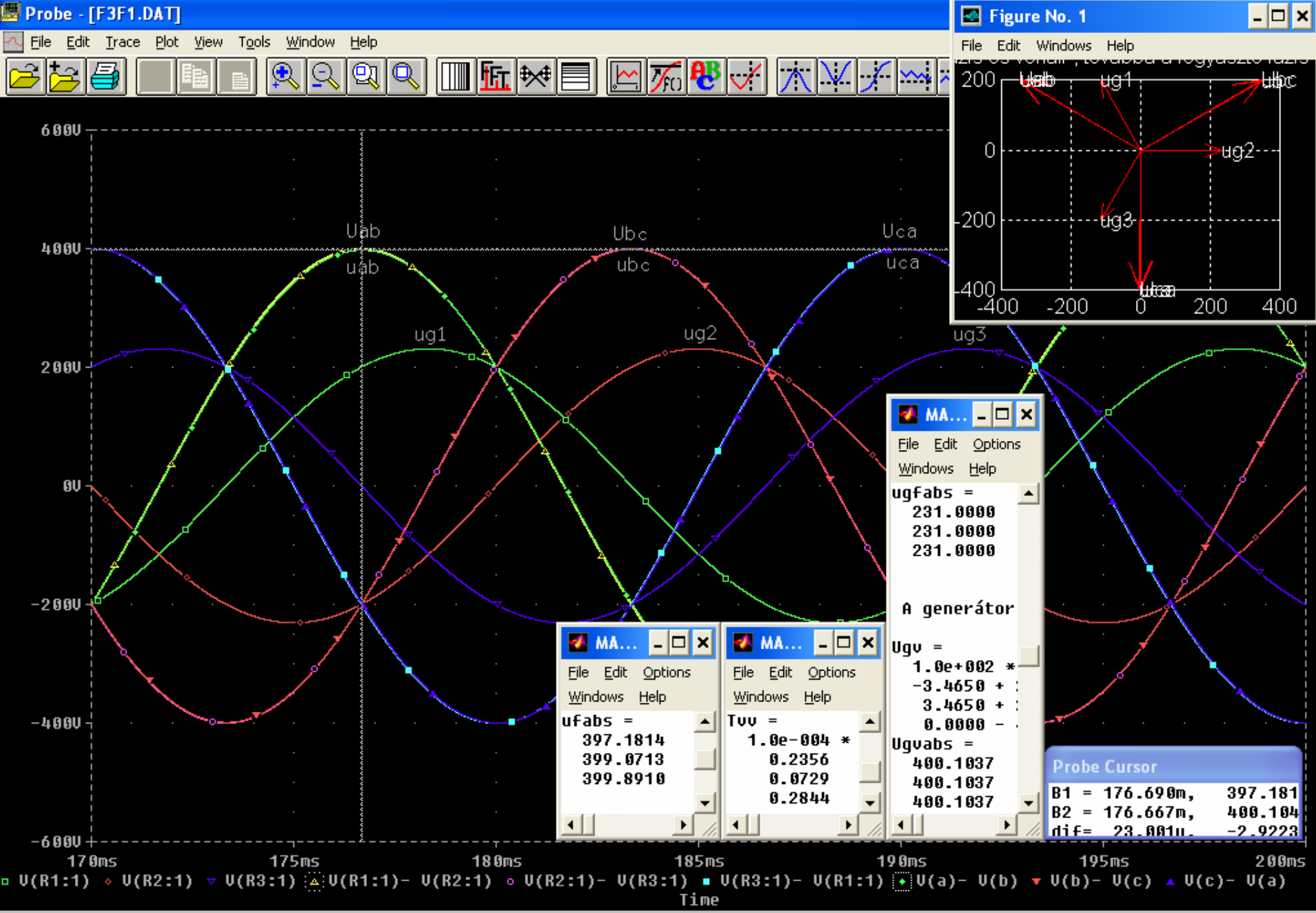

Schematics - [*F3f1.sch:3 p.1 (current)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
Analysis Setup
Enabled
AC Sweep...
Load Bias Point...
Save Bias Point...
DC Sweep...
Monte Carlo/Worst Case...
Bias Point Detail
Digital Setup...
Enabled
Options...
Parametric...
Sensitivity...
Temperature...
Transfer Function...
Transient...
Close
52mH
L4
27
R4
a
R6
27
C6
100u
c
0
V2
R2
.06
L2
.3181m
b
V3
R3
.06
L3
.3181m
Transient
Transient Analysis
Print Step: 0.01ms
Final Time: 30ms
No-Print Delay:
Step Ceiling: .01m
Detailed Bias Pt.
Skip initial transient solution
Fourier Analysis
Enable Fourier
Center Frequency:
Number of harmonics:
Output Vars.:
OK
Cancel
2.53, 1.83
Cmd:

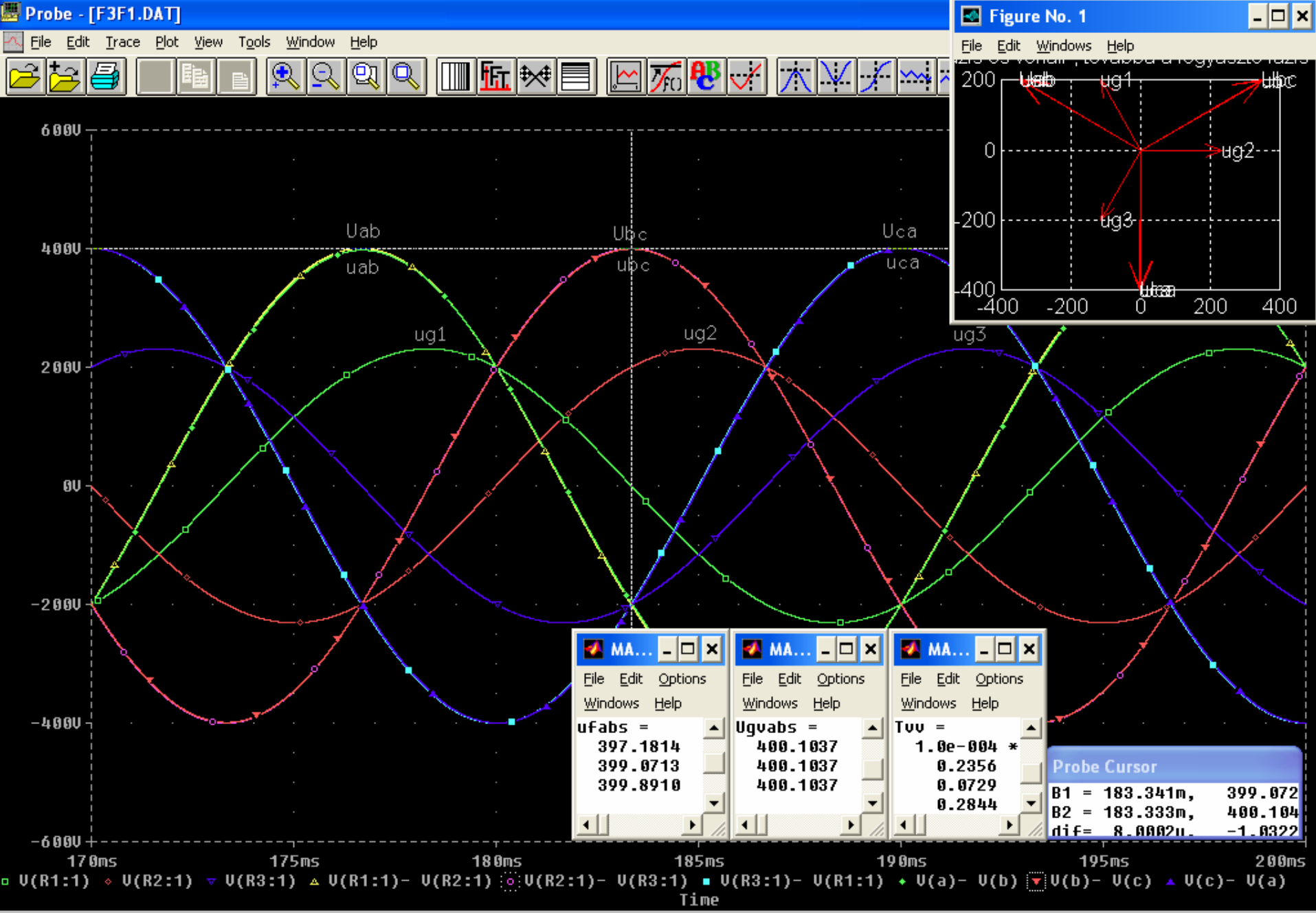

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 5.370E-06
Time = .03
End = .03
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: I(R1) I(R2) I(R3) I(R4) I(R5) I(R6)
OK
Cancel
0s
5ms
10ms
15ms
20ms
25ms
30ms
Time

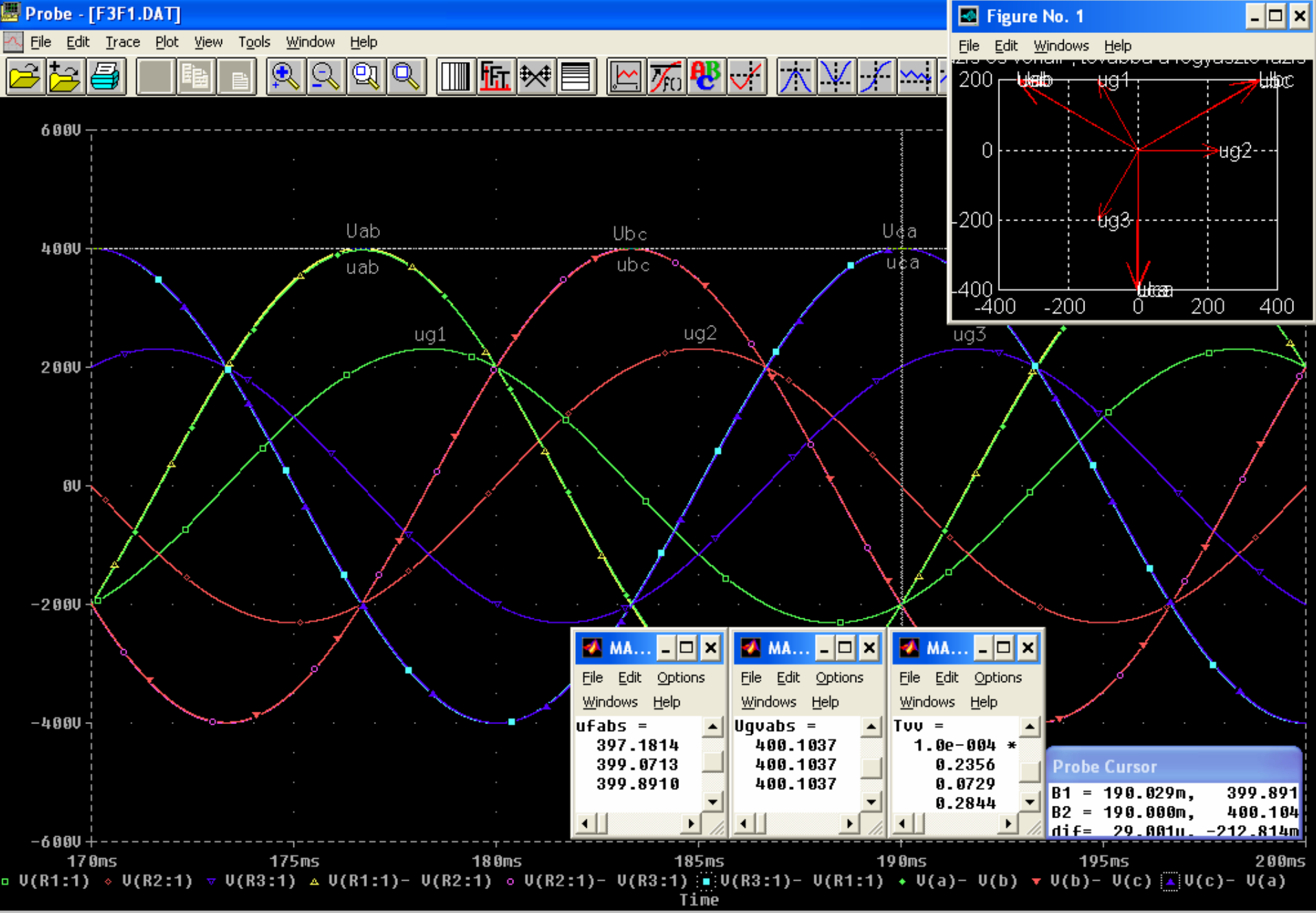

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
ARAMOK
BEKAPCSOLASI TRANZIENS
iv1
iv2
if1
if3
iv3
if2
30A
20A
10A
0A
-10A
-20A
-30A
0s
5ms
10ms
15ms
20ms
25ms
30ms
I(R1) I(R2) I(R3) I(R4) I(R5) I(R6)
Time

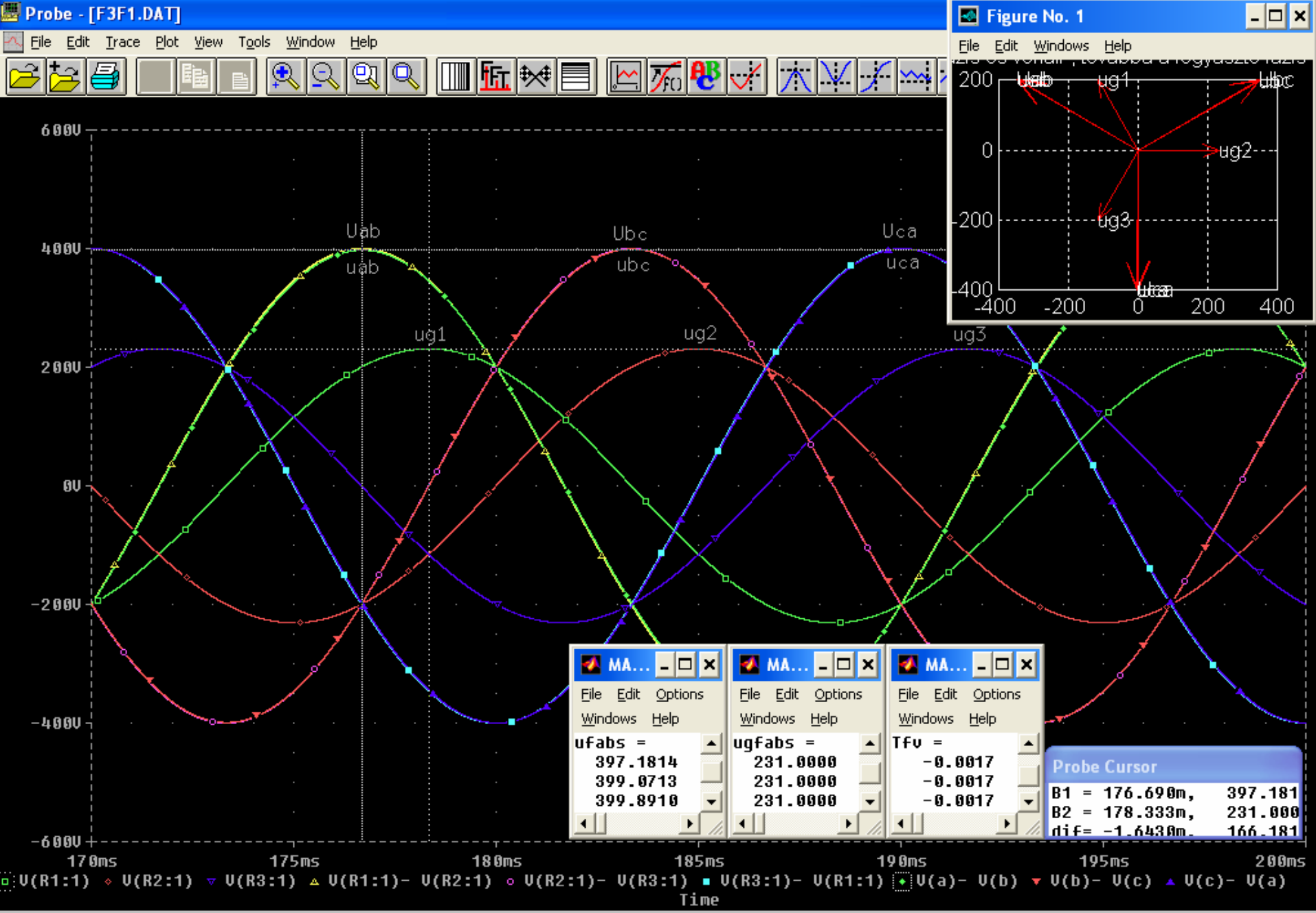

Schematics - [F3f1.sch:4 p.1 (stale)]
File Edit Draw Navigate View Options Analysis Tools Markers Window Help
GND_ANALOG
Analysis Setup
Enabled
AC Sweep...
Load Bias Point...
Save Bias Point...
DC Sweep...
Monte Carlo/Worst Case...
Bias Point Detail
Digital Setup...
Enabled
Options...
Parametric...
Sensitivity...
Temperature...
Transfer Function...
Transient...
Close
52mH
L4
27
R4
a
R6
27
C6
100u
R2
.06
L2
.3181m
b
0
V2
R3
.06
L3
.3181m
V3
c
Transient
Transient Analysis
Print Step: 1us
Final Time: 200ms
No-Print Delay: 170ms
Step Ceiling: 1us
Detailed Bias Pt.
Skip initial transient solution
Fourier Analysis
Enable Fourier
Center Frequency:
Number of harmonics:
Output Vars.:
OK
Cancel
2.53, 1.81
Schematic saved.
Cmd:

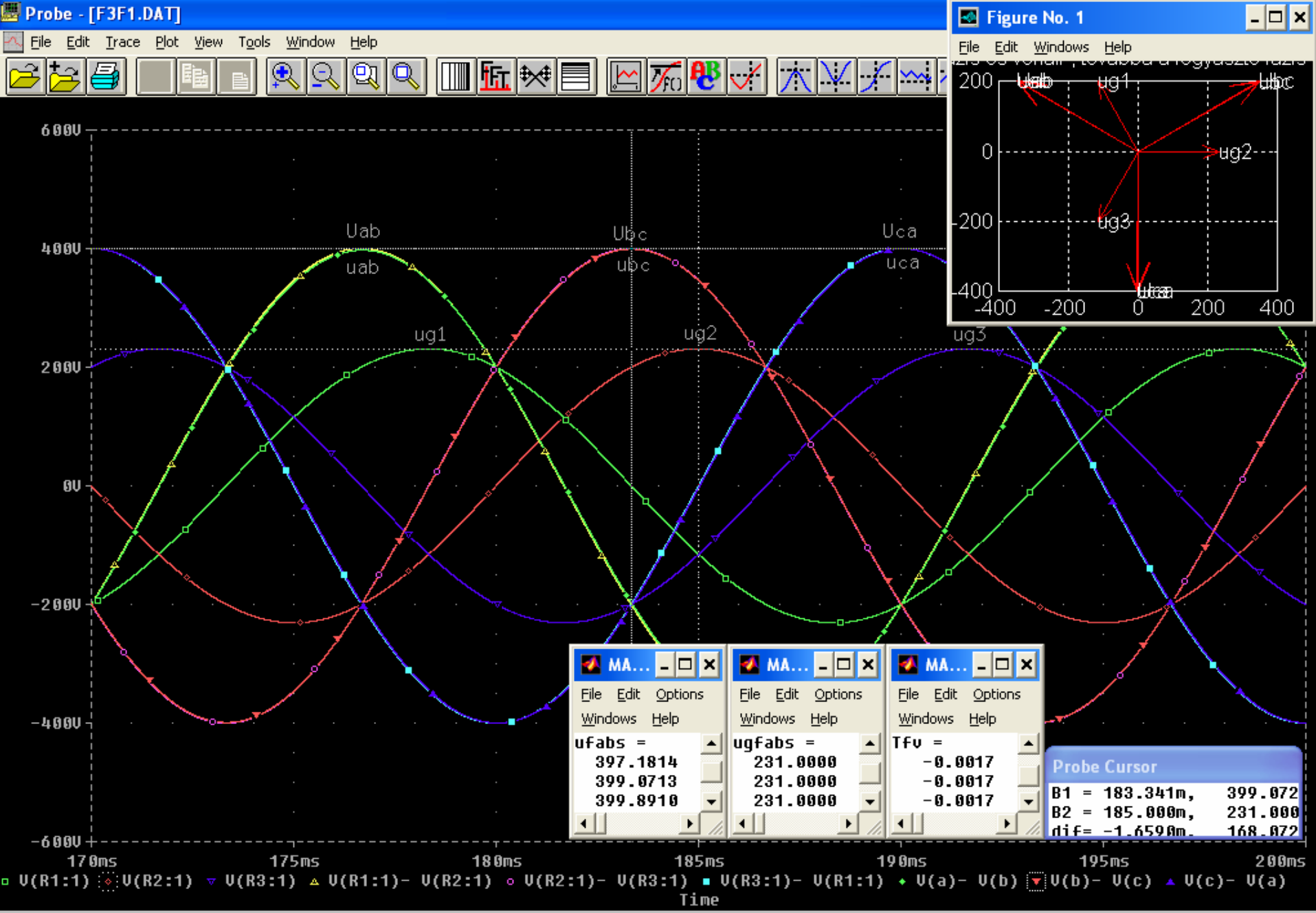

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 3.170E-06
Time = .2
End = .2
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: :1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)-
OK
Cancel
170ms 175ms 180ms 185ms 190ms 195ms 200ms
Time

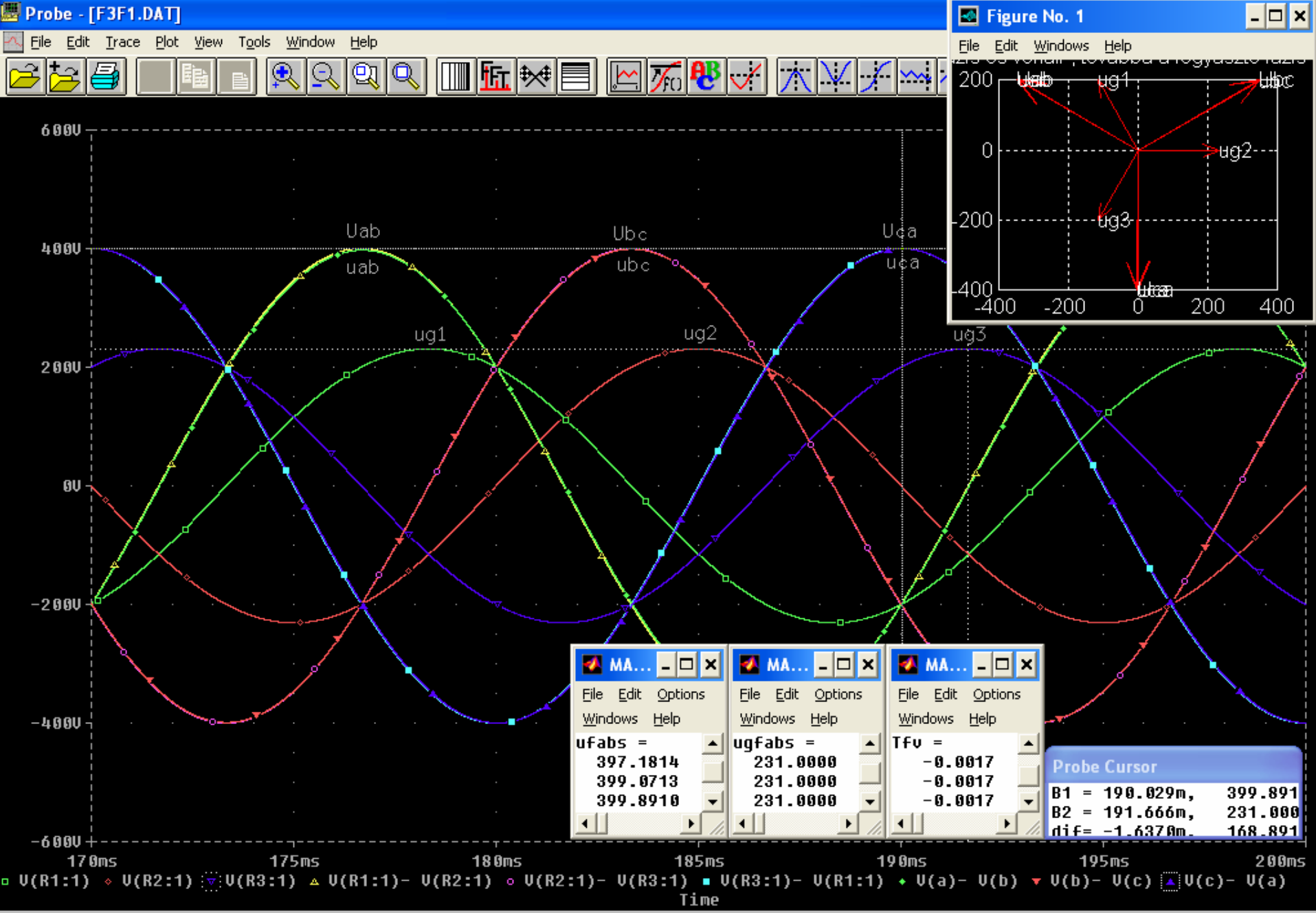

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
600V
400V
200V
0V
-200V
-400V
-600V
Uab
Ubc
Uca
uab
ubc
uca
ug1
ug2
ug3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 1
File Edit Windows Help
200
0
-200
-400
-400 -200 0 200 400
Uab
ug1
Ubc
ug2
ug3
Uca
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
MA...
File Edit Options
Windows Help
Tvv =
1.0e-004 *
0.2356
0.0729
0.2844
MA...
File Edit Options
Windows Help
ugfabs =
231.0000
231.0000
231.0000
A generátor
Ugv =
1.0e+002 *
-3.4650 +
3.4650 +
0.0000 -
Ugvabs =
400.1037
400.1037
400.1037
Probe Cursor
B1 = 176.690m, 397.181
B2 = 176.667m, 400.104
dif= -23.001u, -2.9223

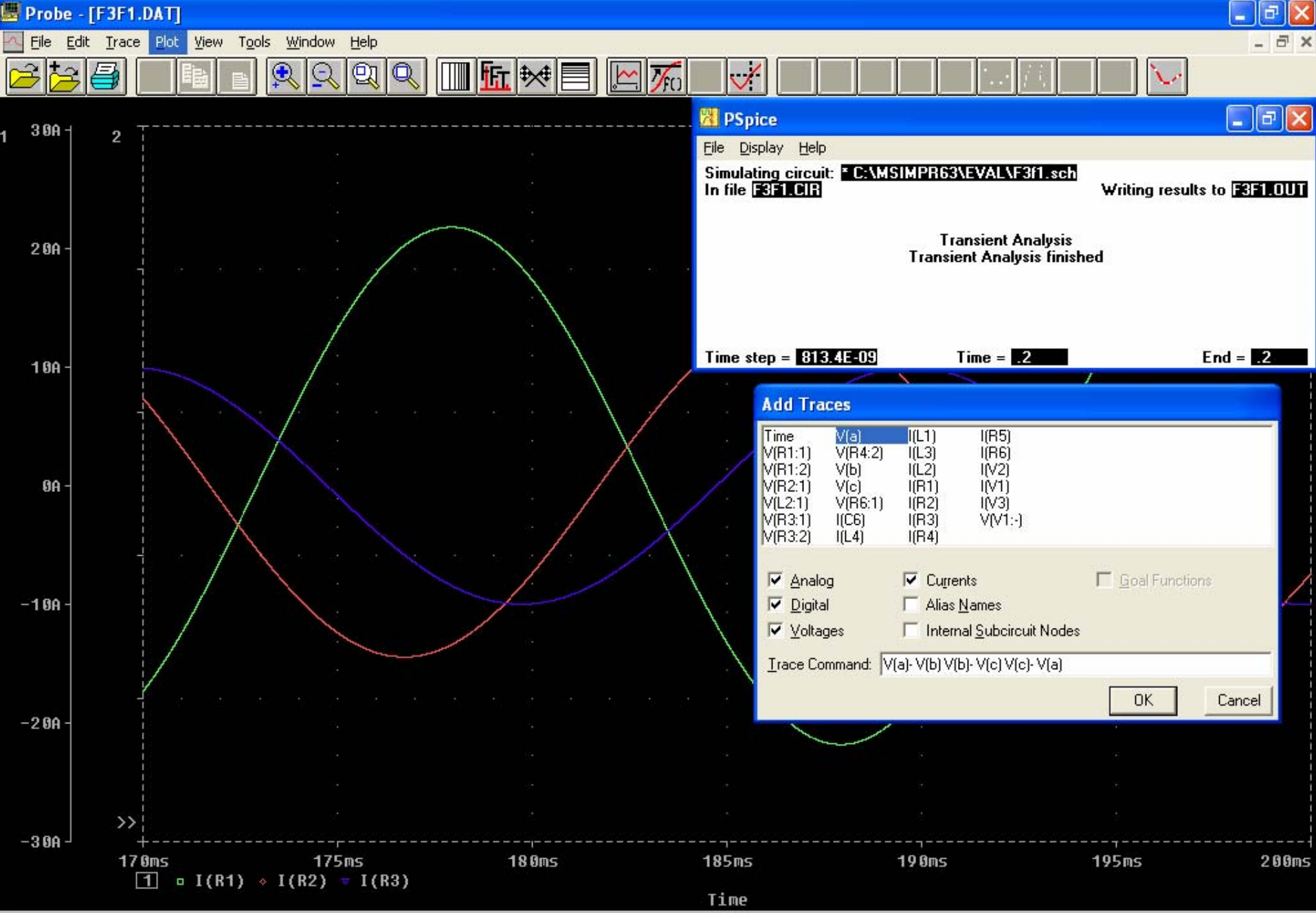

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
600V
400V
200V
0V
-200V
-400V
-600V
Uab
uab
Ubc
ubc
Uca
uca
ug1
ug2
ug3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 1
File Edit Windows Help
200
0
-200
-400
-400 -200 0 200 400
Uab
ug1
Ubc
ug2
ug3
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
Ugvabs =
400.1037
400.1037
400.1037
Tvv =
1.0e-004 *
0.2356
0.0729
0.2844
Probe Cursor
B1 = 183.341m, 399.072
B2 = 183.333m, 400.104
dif= -8.0002u, -1.0322


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
600V
400V
200V
0V
-200V
-400V
-600V
Uab
uab
Ubc
ubc
Uca
uca
ug1
ug2
ug3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 1
File Edit Windows Help
200
0
-200
-400
-400 -200 0 200 400
ug1
ug2
ug3
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
Ugvabs =
400.1037
400.1037
400.1037
Tvv =
1.0e-004 *
0.2356
0.0729
0.2844
Probe Cursor
B1 = 190.029m, 399.891
B2 = 190.000m, 400.104
dif= 29.001u, -212.814m


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
Figure No. 1
File Edit Windows Help
Uab
Ubc
Uca
uab
ubc
uca
ug1
ug2
ug3
600V
400V
200V
0V
-200V
-400V
-600V
170ms
175ms
180ms
185ms
190ms
195ms
200ms
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
ugfabs =
231.0000
231.0000
231.0000
Tfv =
-0.0017
-0.0017
-0.0017
Probe Cursor
B1 = 176.690m, 397.181
B2 = 178.333m, 231.000
dif= -1.6430m, 166.181
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time

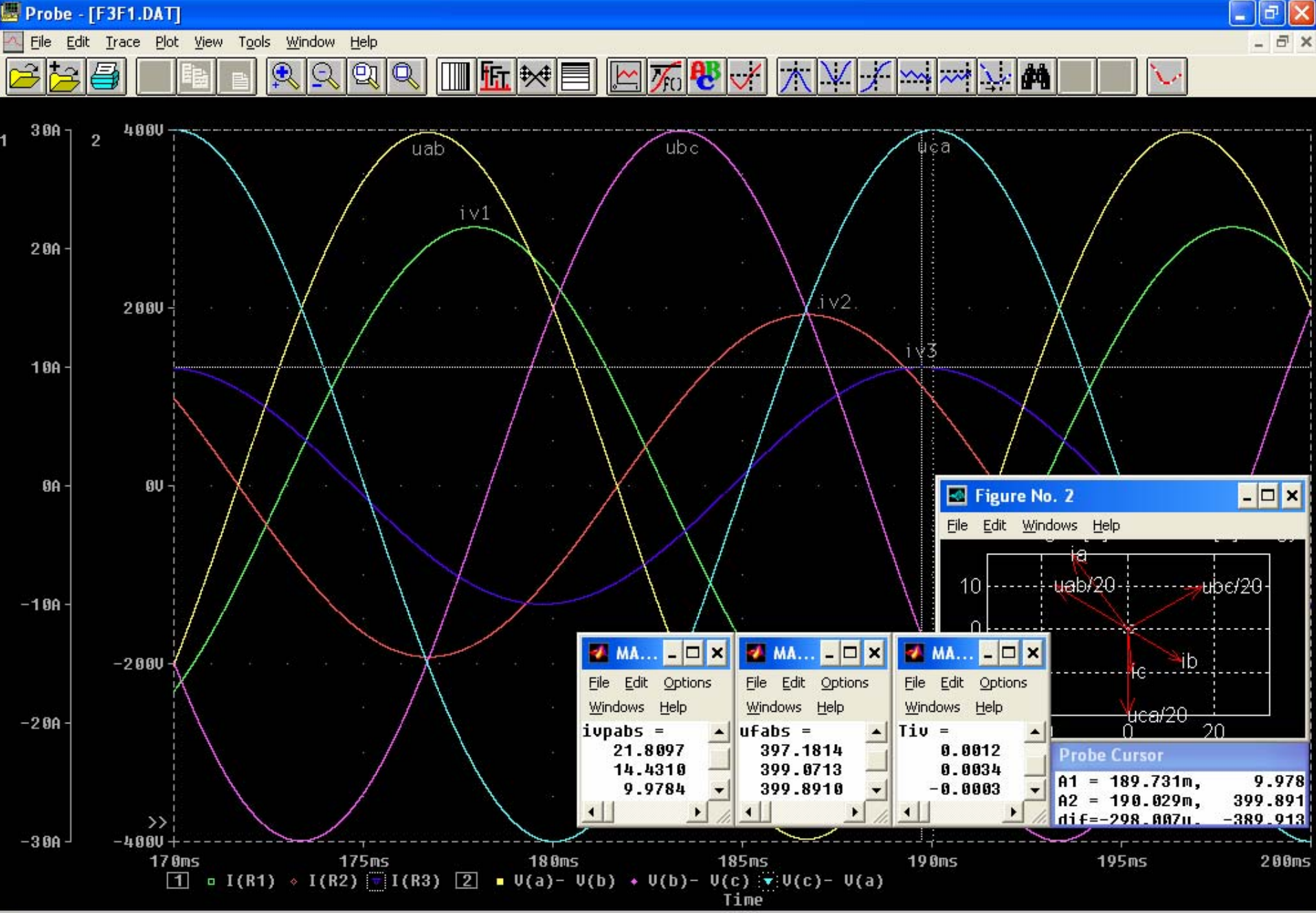

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
600V
400V
200V
0V
-200V
-400V
-600V
Uab
uab
Ubc
ubc
Uca
uca
ug1
ug2
ug3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 1
File Edit Windows Help
200
0
-200
-400
-400 -200 0 200 400
Uab
ug1
Ubc
ug2
ug3
Uca
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
ugfabs =
231.0000
231.0000
231.0000
Tfv =
-0.0017
-0.0017
-0.0017
Probe Cursor
B1 = 183.341m, 399.072
B2 = 185.000m, 231.000
dif= -1.6590m, 168.072

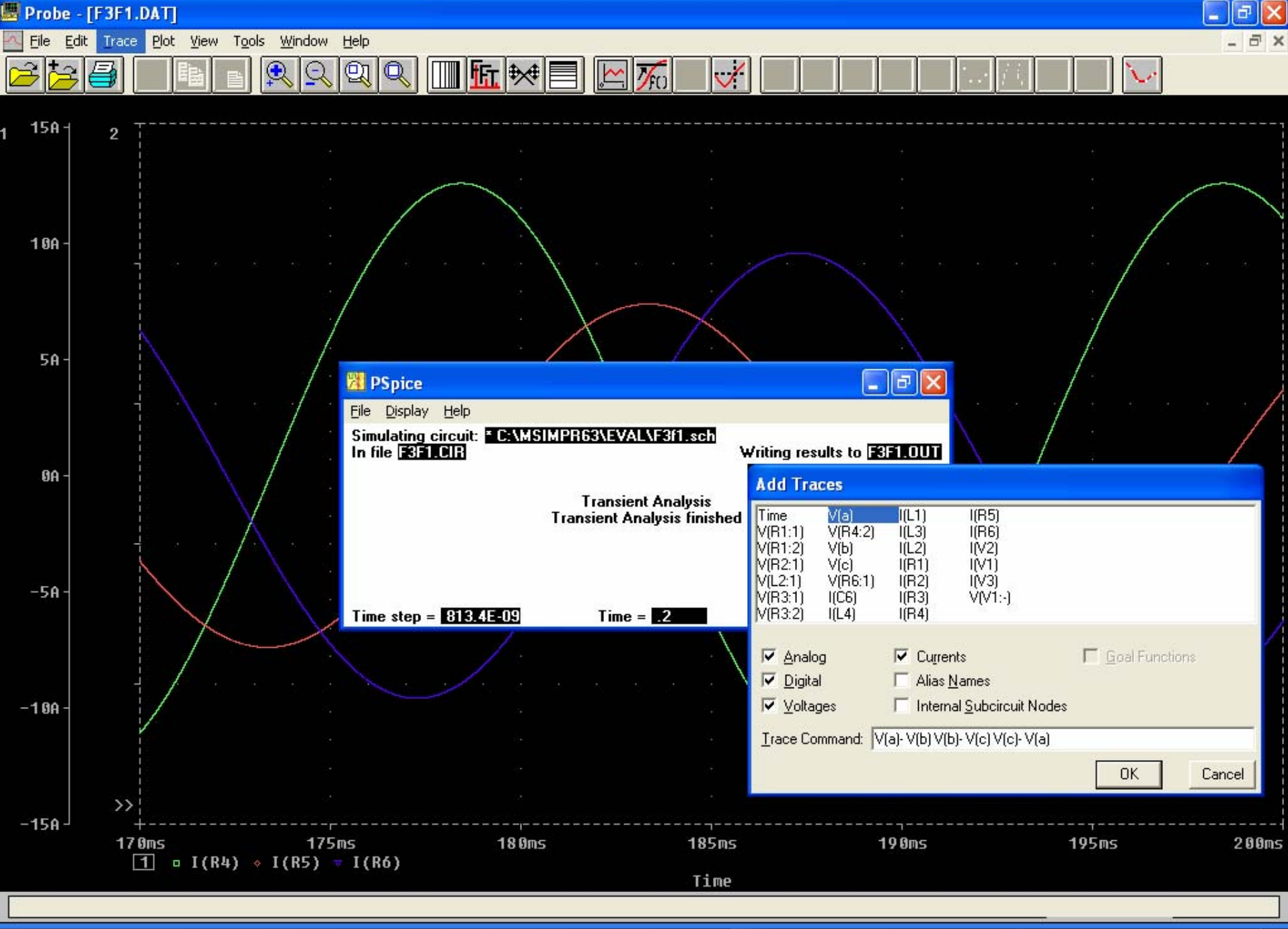

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
600V
400V
200V
0V
-200V
-400V
-600V
Uab
Ubc
Uca
uab
ubc
uca
ug1
ug2
ug3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1) V(R2:1) V(R3:1) V(R1:1)- V(R2:1) V(R2:1)- V(R3:1) V(R3:1)- V(R1:1) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 1
File Edit Windows Help
200
0
-200
-400
-400 -200 0 200 400
Uab
ug1
Ubc
ug2
ug3
Uca
MA...
File Edit Options
Windows Help
ufabs =
397.1814
399.0713
399.8910
ugfabs =
231.0000
231.0000
231.0000
Tfv =
-0.0017
-0.0017
-0.0017
Probe Cursor
B1 = 190.029m, 399.891
B2 = 191.666m, 231.000
dif= -1.6370m, 168.891

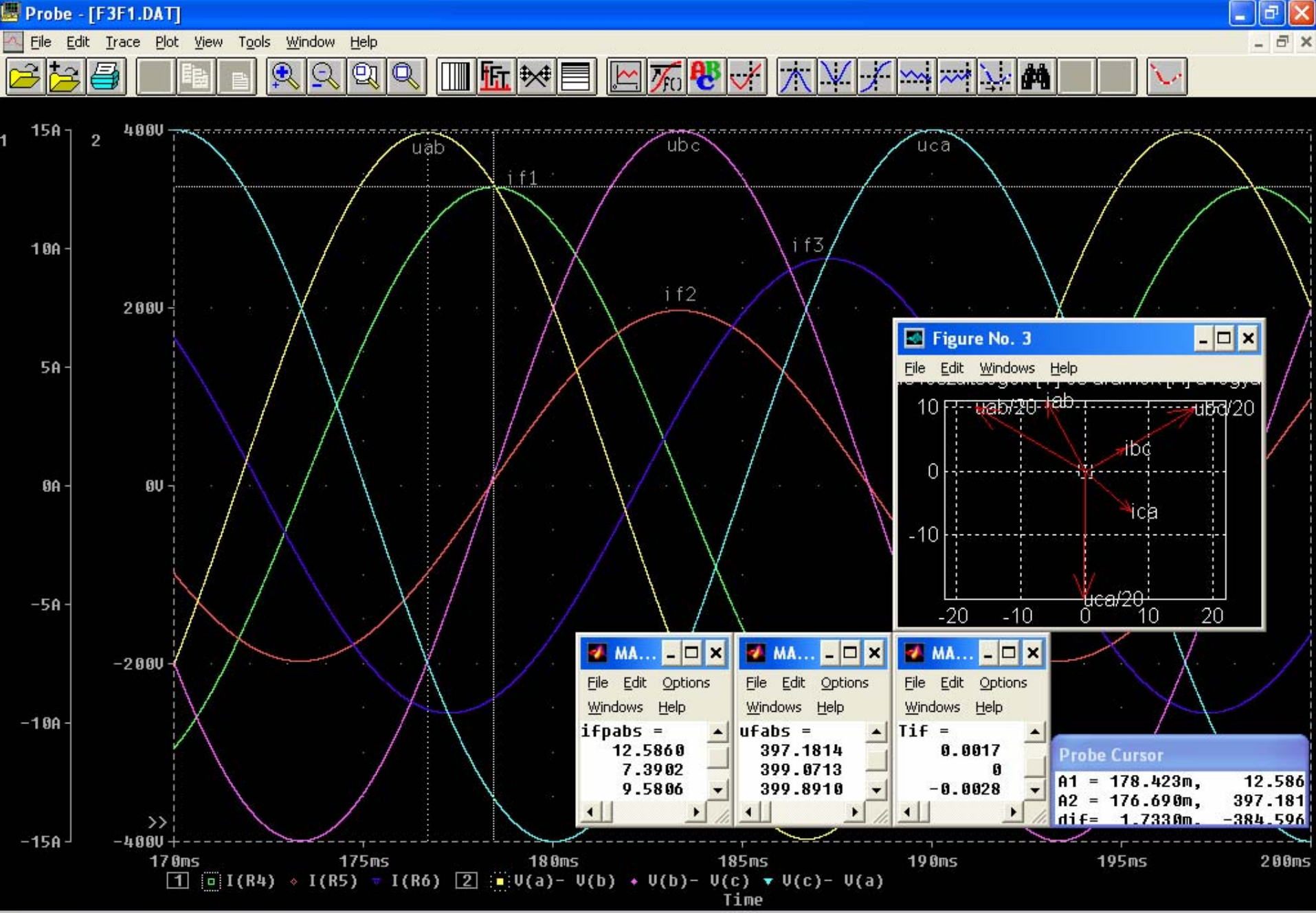

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 813.4E-09
Time = .2
End = .2
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: V(a)- V(b) V(b)- V(c) V(c)- V(a)
OK
Cancel
30A
20A
10A
0A
-10A
-20A
-30A
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R1) I(R2) I(R3)
Time

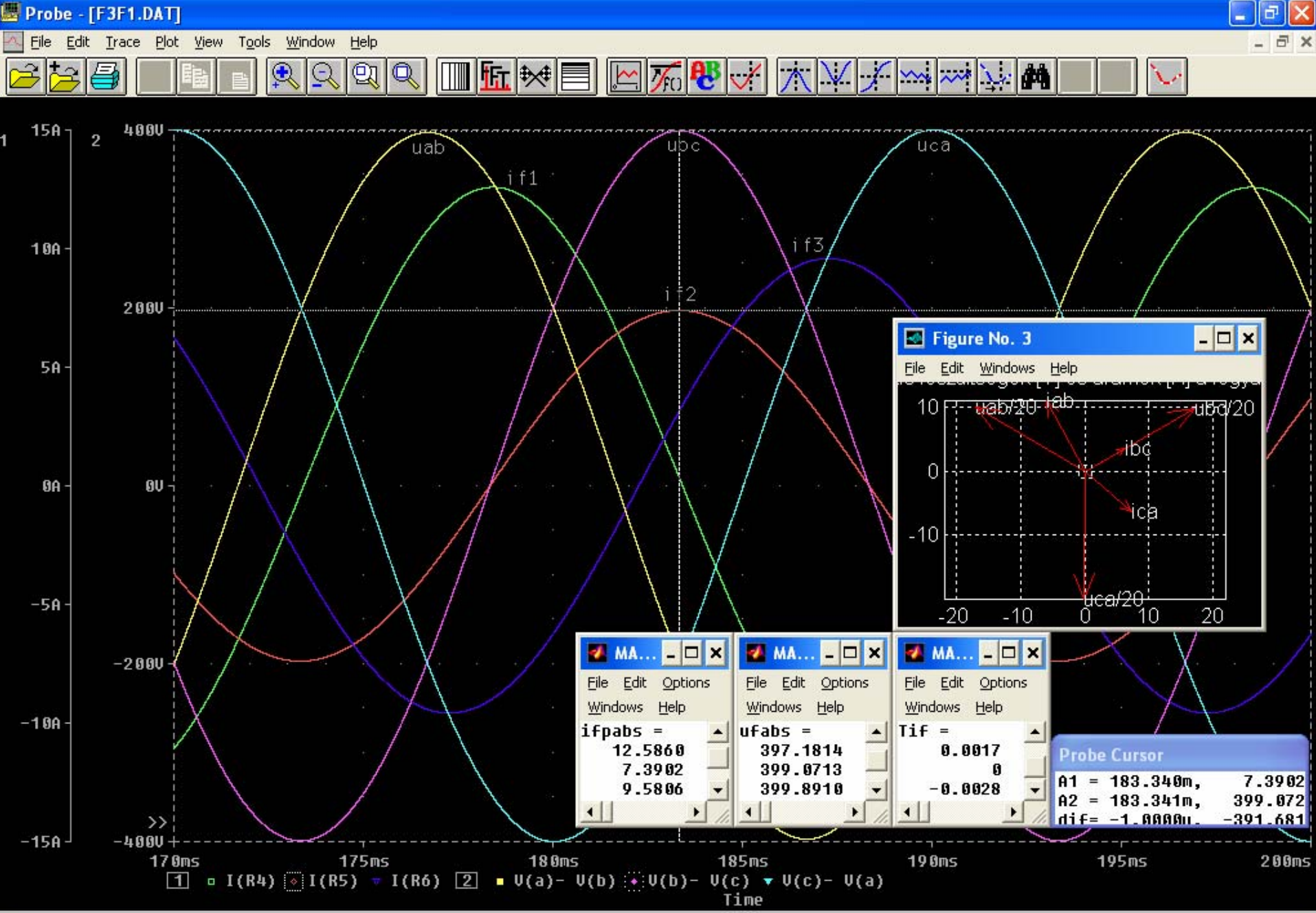

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
30A
20A
10A
0A
-10A
-20A
-30A
400V
200V
0V
-200V
-400V
uab
ubc
uca
iv1
iv2
iv3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R1) I(R2) I(R3) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 2
File Edit Windows Help
ia
ib
ic
uab/20
ubc/20
uca/20
10
0
-10
-20
-20
0
20
MA...
File Edit Options
Windows Help
ivpabs =
21.8097
14.4310
9.9784
ufabs =
397.1814
399.0713
399.8910
Tiv =
0.0012
0.0034
-0.0003
Probe Cursor
A1 = 177.925m, 21.810
A2 = 176.690m, 397.181
dif= 1.2350m, -375.372
Toggle Display of cursor

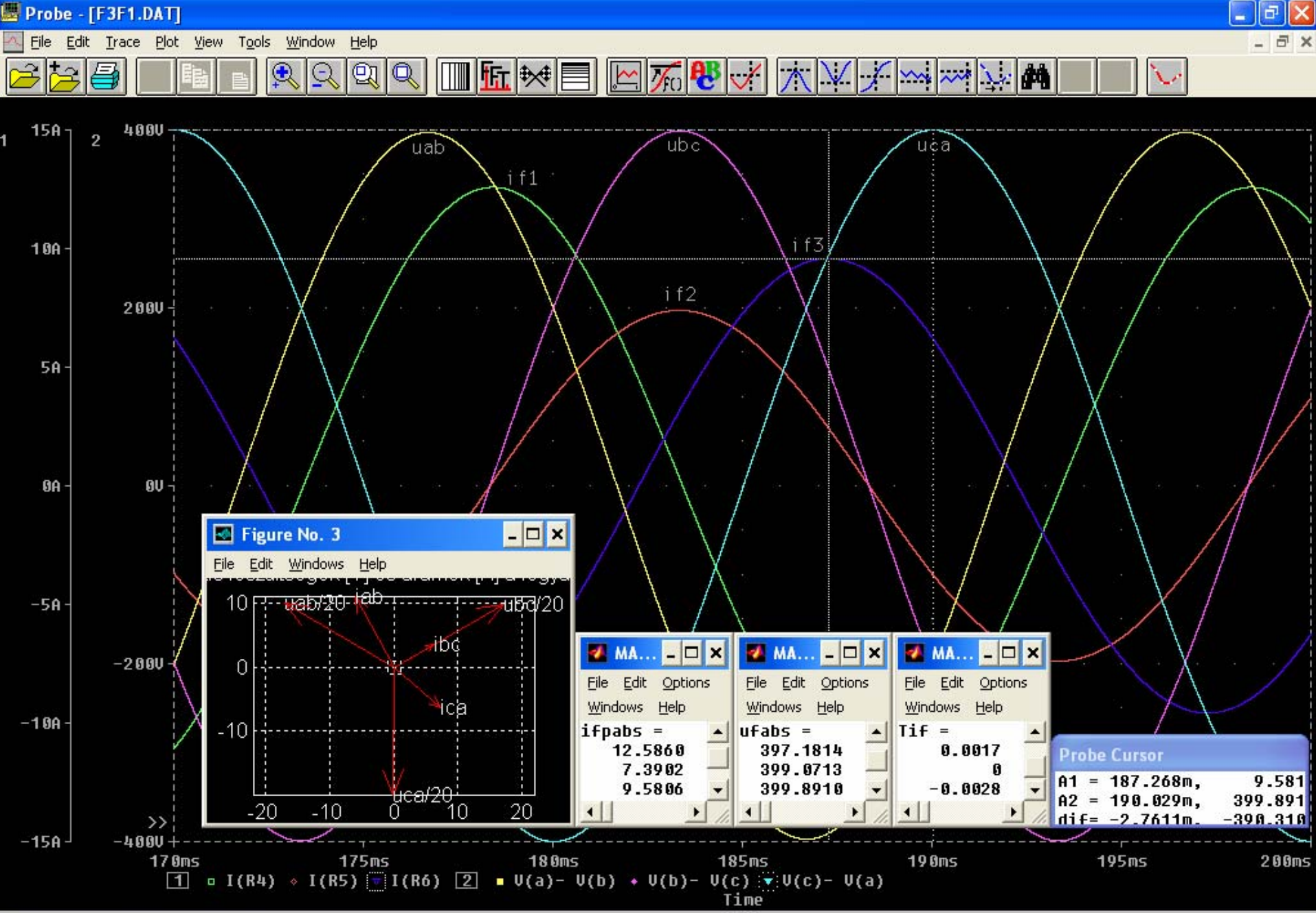

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
30A
20A
10A
0A
-10A
-20A
-30A
400V
200V
0V
-200V
-400V
uab
ubc
uca
iv1
iv2
iv3
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R1) I(R2) I(R3) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 2
File Edit Windows Help
ia
ib
ic
uab/20
ubc/20
uca/20
10
0
20
MA...
File Edit Options
Windows Help
ivpabs =
21.8097
14.4310
9.9784
ufabs =
397.1814
399.0713
399.8910
Tiv =
0.0012
0.0034
-0.0003
Probe Cursor
A1 = 186.712m, 14.431
A2 = 183.341m, 399.072
dif= 3.3711m, -384.641
Could not find specified point

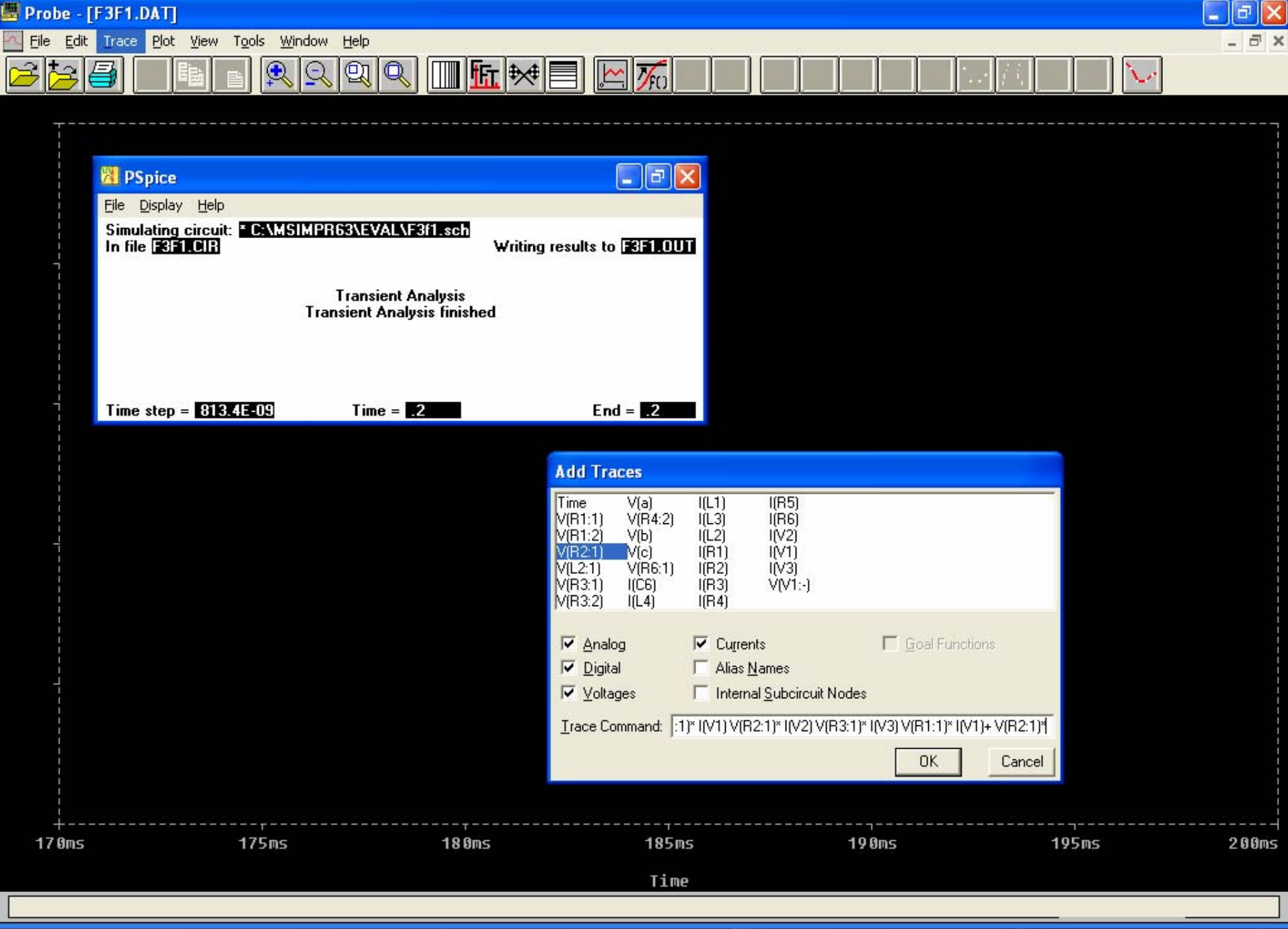

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
uab
ubc
uca
iv1
iv2
iv3
30A
20A
10A
0A
-10A
-20A
-30A
400V
200V
0V
-200V
-400V
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R1) I(R2) I(R3) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 2
File Edit Windows Help
ia
ib
ic
uab/20
ubc/20
uca/20
10
0
20
MA...
File Edit Options
Windows Help
ivpabs =
21.8097
14.4310
9.9784
ufabs =
397.1814
399.0713
399.8910
Tiv =
0.0012
0.0034
-0.0003
Probe Cursor
A1 = 189.731m, 9.978
A2 = 190.029m, 399.891
dif=-298.007u, -389.913

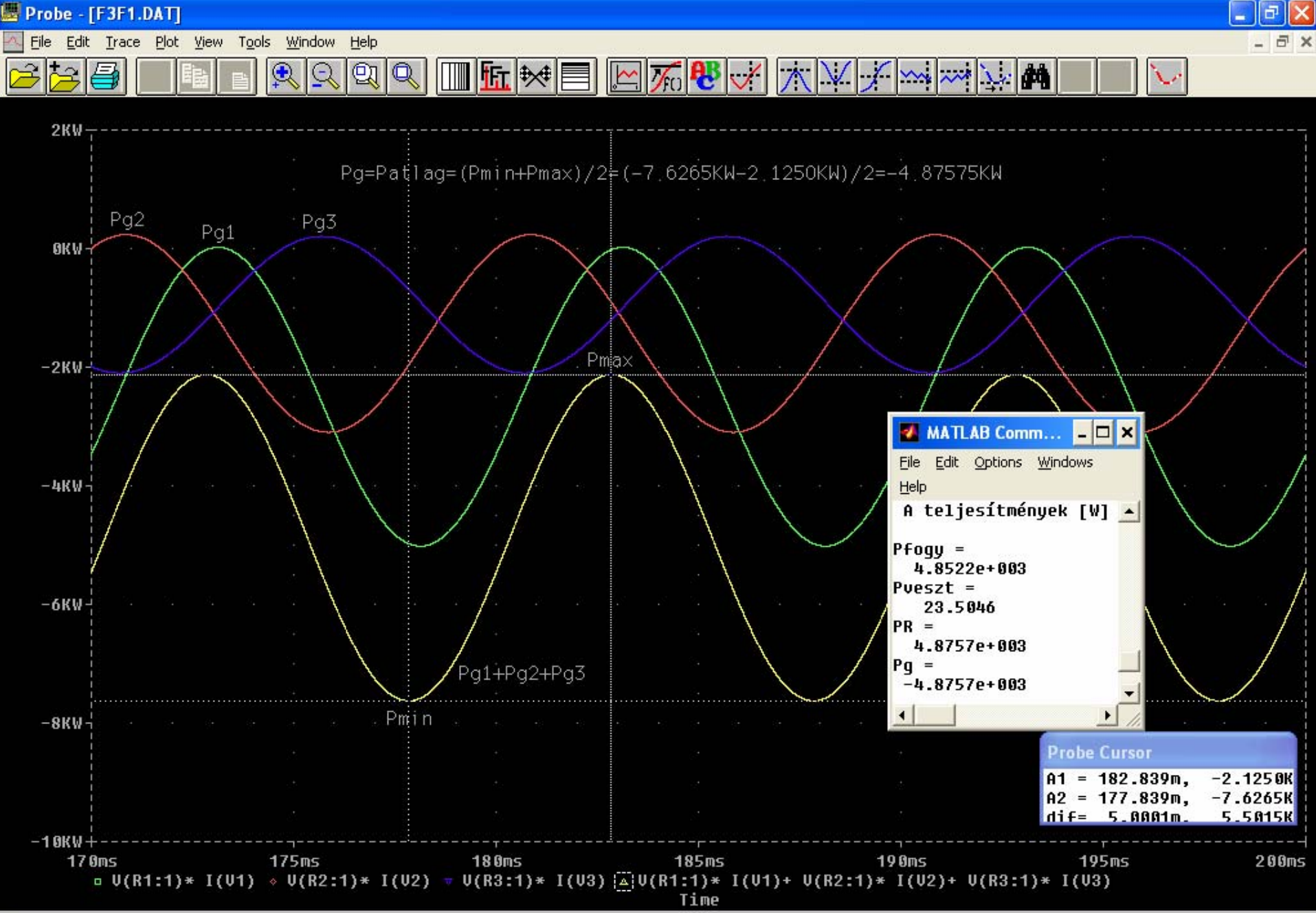

Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
15A
10A
5A
0A
-5A
-10A
-15A
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R4) I(R5) I(R6)
Time
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 813.4E-09
Time = .2
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: V(a)- V(b) V(b)- V(c) V(c)- V(a)
OK
Cancel


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
uab
ubc
uca
i f1
i f2
i f3
15A
10A
5A
0A
-5A
-10A
-15A
400V
200V
0V
-200V
-400V
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R4) I(R5) I(R6) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 3
File Edit Windows Help
uab/20
iab
ubc/20
ibc
ica
uca/20
10
0
-10
-20
-10
0
10
20
MA...
File Edit Options
Windows Help
ifpabs =
12.5860
7.3902
9.5806
ufabs =
397.1814
399.0713
399.8910
Tif =
0.0017
0
-0.0028
Probe Cursor
A1 = 178.423m, 12.586
A2 = 176.690m, 397.181
dif= -1.7330m, -384.596
Position cursor at next peak value


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
uab
ubc
uca
i f1
i f2
i f3
15A
10A
5A
0A
-5A
-10A
-15A
400V
200V
0V
-200V
-400V
170ms
175ms
180ms
185ms
190ms
195ms
200ms
I(R4) I(R5) I(R6) V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Figure No. 3
File Edit Windows Help
uab/20
iab
ubc/20
ibc
ica
uca/20
10
0
-10
-20
-10
0
10
20
MA...
File Edit Options
Windows Help
ifpabs =
12.5860
7.3902
9.5806
ufabs =
397.1814
399.0713
399.8910
Tif =
0.0017
0
-0.0028
Probe Cursor
A1 = 183.340m, 7.3902
A2 = 183.341m, 399.072
dif= -1.0000u, -391.681


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
uab
ubc
uca
i f1
i f2
i f3
400V
200V
0V
-200V
-400V
15A
10A
5A
0A
-5A
-10A
-15A
170ms
175ms
180ms
185ms
190ms
195ms
200ms
Figure No. 3
File Edit Windows Help
uab/20
ubc/20
uca/20
iab
ibc
ica
10
0
-10
-20
-10
0
10
20
MA...
File Edit Options
Windows Help
ifpabs =
12.5860
7.3902
9.5806
ufabs =
397.1814
399.0713
399.8910
Tif =
0.0017
0
-0.0028
Probe Cursor
A1 = 187.268m, 9.581
A2 = 190.029m, 399.891
dif= -2.7611m, -390.310
1 I(R4) I(R5) I(R6) 2 V(a)- V(b) V(b)- V(c) V(c)- V(a)
Time
Could not find specified point


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
PSpice
File Display Help
Simulating circuit: * C:\MSIMPR63\EVAL\F3f1.sch
In file F3F1.CIR
Writing results to F3F1.OUT
Transient Analysis
Transient Analysis finished
Time step = 813.4E-09
Time = .2
End = .2
Add Traces
Time V(a) I(L1) I(R5)
V(R1:1) V(R4:2) I(L3) I(R6)
V(R1:2) V(b) I(L2) I(V2)
V(R2:1) V(c) I(R1) I(V1)
V(L2:1) V(R6:1) I(R2) I(V3)
V(R3:1) I(C6) I(R3) V(V1:-)
V(R3:2) I(L4) I(R4)
Analog
Digital
Voltages
Currents
Alias Names
Internal Subcircuit Nodes
Goal Functions
Trace Command: :1)* I(V1) V(R2:1)* I(V2) V(R3:1)* I(V3) V(R1:1)* I(V1)+ V(R2:1)*
OK
Cancel
170ms
175ms
180ms
185ms
190ms
195ms
200ms
Time


Probe - [F3F1.DAT]
File Edit Trace Plot View Tools Window Help
Pg=Patlag=(Pmin+Pmax)/2=(-7.6265KW-2.1250KW)/2=-4.87575KW
Pg2
Pg1
Pg3
Pmax
Pg1+Pg2+Pg3
Pmin
2KW
0KW
-2KW
-4KW
-6KW
-8KW
-10KW
170ms
175ms
180ms
185ms
190ms
195ms
200ms
V(R1:1)* I(V1) V(R2:1)* I(V2) V(R3:1)* I(V3) V(R1:1)* I(V1)+ V(R2:1)* I(V2)+ V(R3:1)* I(V3)
Time
MATLAB Comm...
File Edit Options Windows
Help
A teljesítmények [W]
Pfogy =
4.8522e+003
Pveszt =
23.5046
PR =
4.8757e+003
Pg =
-4.8757e+003
Probe Cursor
A1 = 182.839m, -2.1250K
A2 = 177.839m, -7.6265K
dif= 5.0001m, 5.5015K

VÉGE