photovoltaic system
(o Paulo utilizou no TCC dele)

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MEU TCC COM O OPENDSS

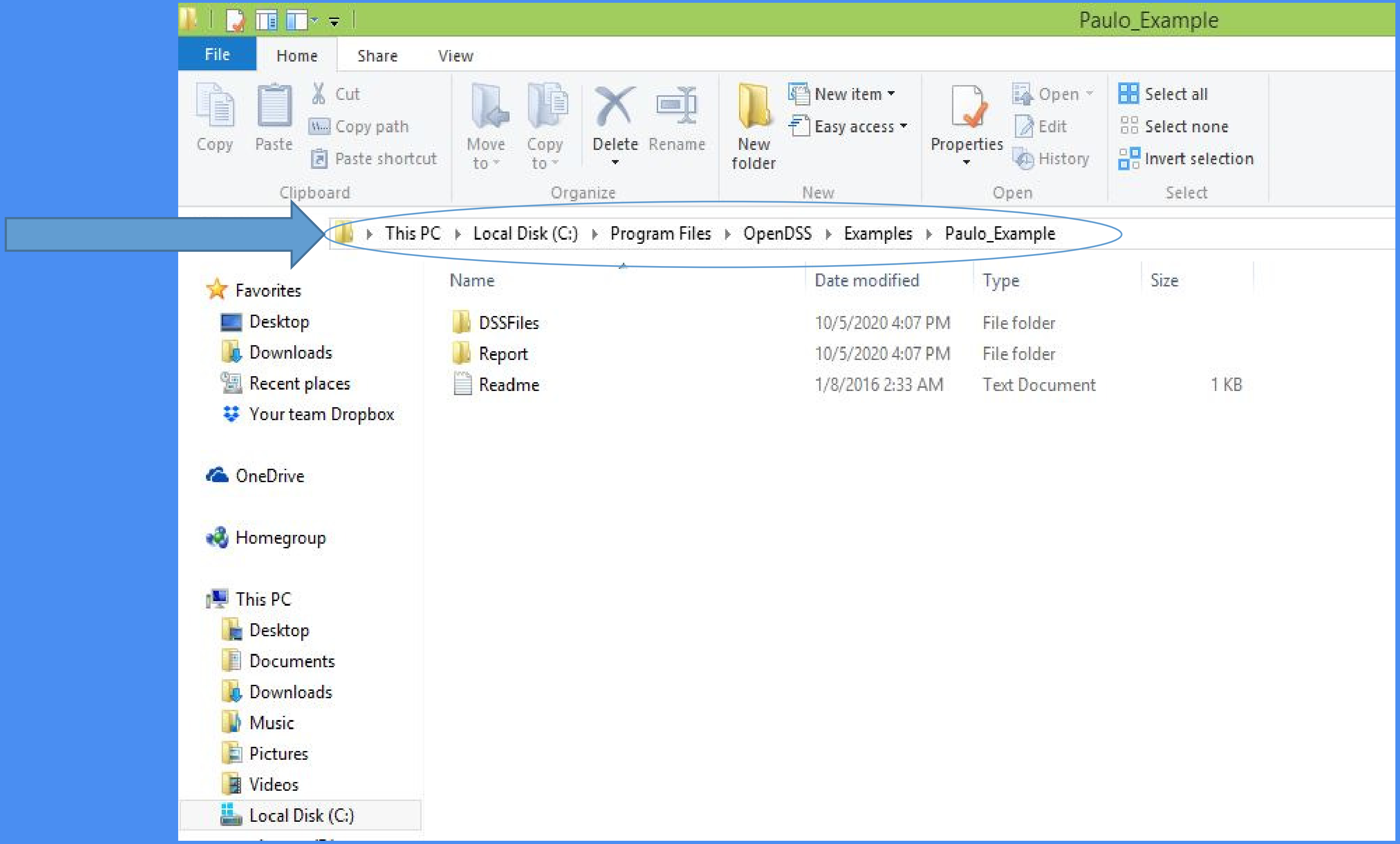
Referência:

https://www.youtube.com/playlist?list=PLhdRxvt3nJ8xE9lZL2hgk8RqFDstTZB8h

OBJETIVOS

- Simulate 13-bus distribution system in static mode
- Evaluate the power, voltage and current of the system loads
- Describe the power flow
- Time-series simulation (simulation over a day with one hour time interval)
- time-series static with and without resources (PV systems)
- Model a storage system in the network

DOWNLOAD


Paulo_Example
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Your team Dropbox
OneDrive
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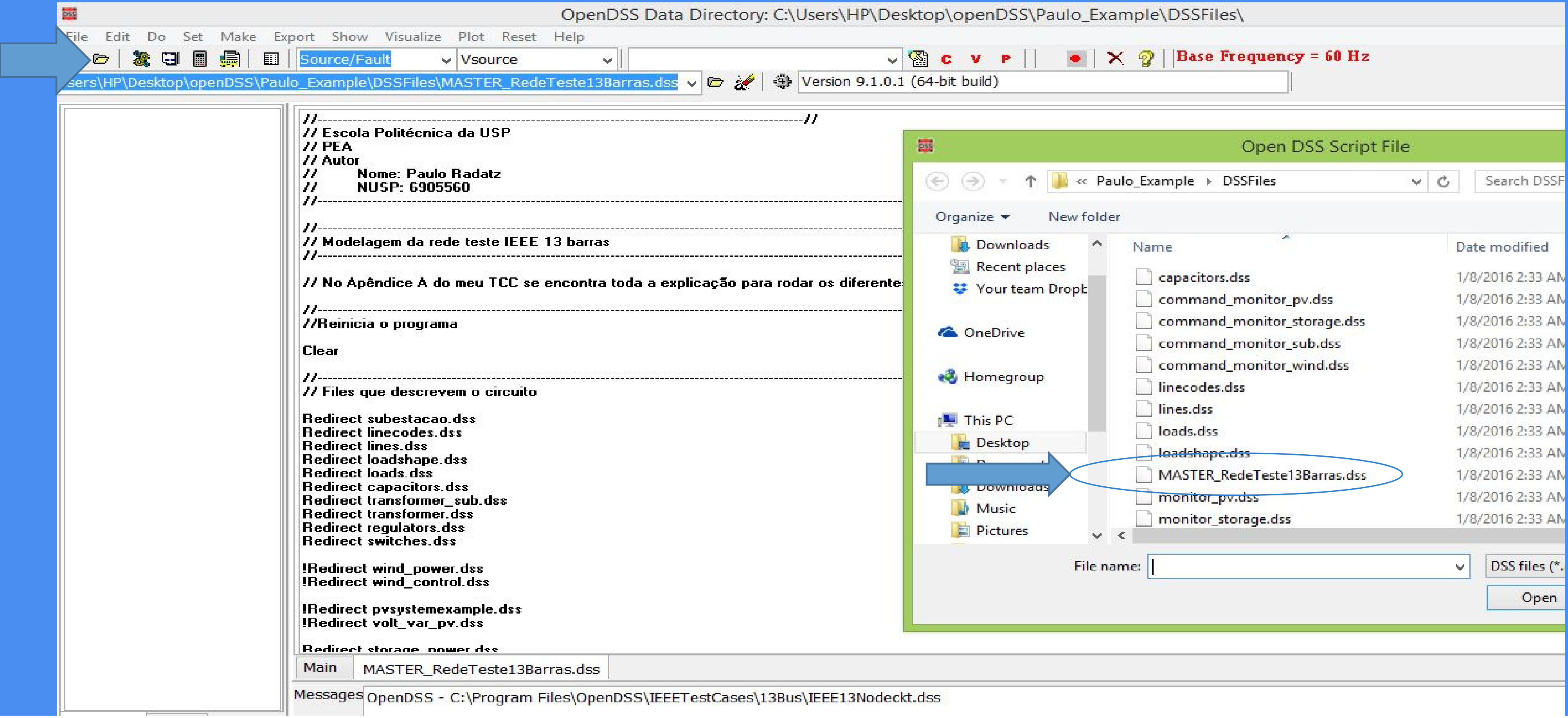
This PC ▸ Local Disk (C:) ▸ Program Files ▸ OpenDSS ▸ Examples ▸ Paulo_Example

Name	Date modified	Type	Size
DSSFiles	10/5/2020 4:07 PM	File folder	
Report	10/5/2020 4:07 PM	File folder	
Readme	1/8/2016 2:33 AM	Text Document	1 KB

ARQUIVO MASTER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Open
Main

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\

Base Frequency = 60 Hz

sers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss

Version 9.1.0.1 (64-bit build)

```
//-------------------------------------------------------------------------------------//
// Escola Politécnica da USP
// PEA
// Autor
//        Nome: Paulo Radatz
//        NUSP: 6905560
//-------------------------------------------------------------------------------------------------------------------

//-------------------------------------------------------------------------------------------------------------------
// Modelagem da rede teste IEEE 13 barras
//-------------------------------------------------------------------------------------------------------------------

// No Apêndice A do meu TCC se encontra toda a explicação para rodar os diferente

//-------------------------------------------------------------------------------------------------------------------
//Reinicia o programa

Clear

//-------------------------------------------------------------------------------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

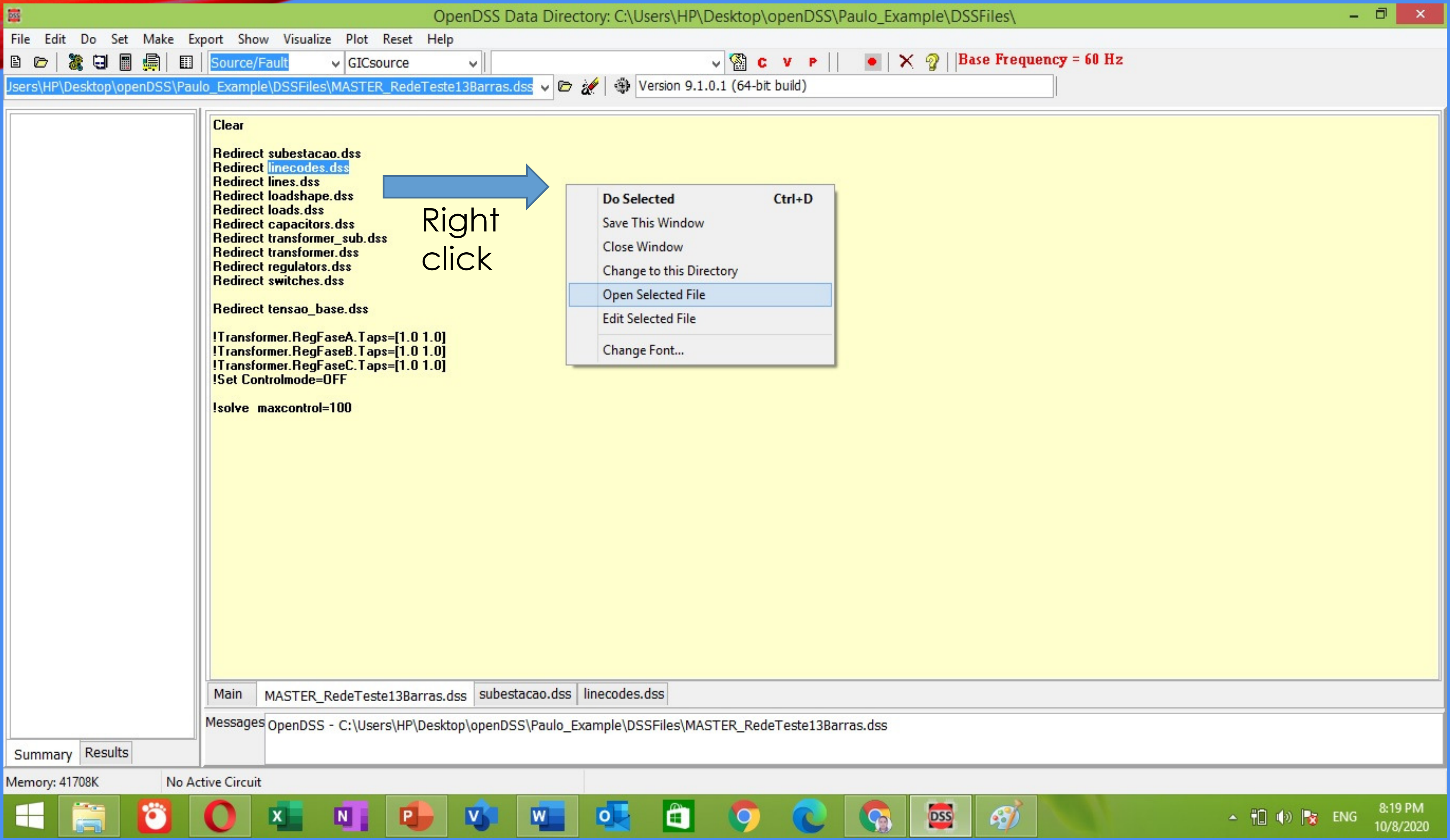
Redirect storage_power.dss
```

Name	Date modified
capacitors.dss	1/8/2016 2:33 AM
command_monitor_pv.dss	1/8/2016 2:33 AM
command_monitor_storage.dss	1/8/2016 2:33 AM
command_monitor_sub.dss	1/8/2016 2:33 AM
command_monitor_wind.dss	1/8/2016 2:33 AM
linecodes.dss	1/8/2016 2:33 AM
lines.dss	1/8/2016 2:33 AM
loads.dss	1/8/2016 2:33 AM
loadshape.dss	1/8/2016 2:33 AM
MASTER_RedeTeste13Barras.dss	1/8/2016 2:33 AM
monitor_pv.dss	1/8/2016 2:33 AM
monitor_storage.dss	1/8/2016 2:33 AM

File name:

MASTER_RedeTeste13Barras.dss

Messages OpenDSS - C:\Program Files\OpenDSS\IEEETestCases\13Bus\IEEE13Nodeckt.dss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Version 9.1.0.1 (64-bit build)
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Open Selected File
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MASTER_RedeTeste13Barras.dss
subestacao.dss
linecodes.dss
Messages
Summary
Results
Memory: 41708K
No Active Circuit
ENG
8:19 PM
10/8/2020

```
Clear

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

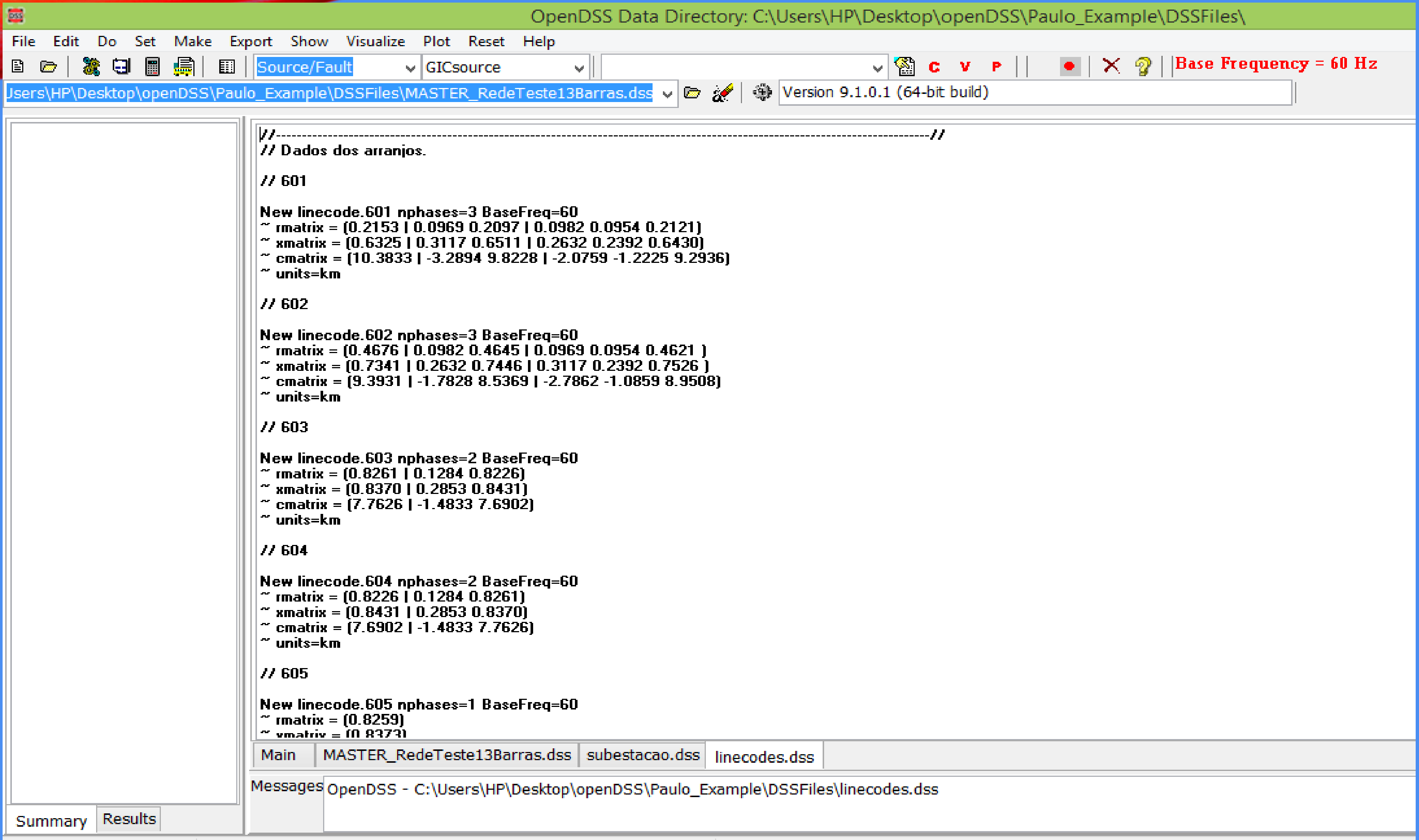
Redirect tensao_base.dss

!Transformer.RegFaseA.Taps=[1.0 1.0]
!Transformer.RegFaseB.Taps=[1.0 1.0]
!Transformer.RegFaseC.Taps=[1.0 1.0]
!Set Controlmode=OFF

!solve  maxcontrol=100
```

Right click

OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss



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subestacao.dss
linecodes.dss
Messages

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\

Base Frequency = 60 Hz

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Version 9.1.0.1 (64-bit build)

```
//----------------------------------------------------------------------------------------------------------------------//
// Dados dos arranjos.

// 601

New linecode.601 nphases=3 BaseFreq=60
~ rmatrix = (0.2153 | 0.0969 0.2097 | 0.0982 0.0954 0.2121)
~ xmatrix = (0.6325 | 0.3117 0.6511 | 0.2632 0.2392 0.6430)
~ cmatrix = (10.3833 | -3.2894 9.8228 | -2.0759 -1.2225 9.2936)
~ units=km

// 602

New linecode.602 nphases=3 BaseFreq=60
~ rmatrix = (0.4676 | 0.0982 0.4645 | 0.0969 0.0954 0.4621 )
~ xmatrix = (0.7341 | 0.2632 0.7446 | 0.3117 0.2392 0.7526 )
~ cmatrix = (9.3931 | -1.7828 8.5369 | -2.7862 -1.0859 8.9508)
~ units=km

// 603

New linecode.603 nphases=2 BaseFreq=60
~ rmatrix = (0.8261 | 0.1284 0.8226)
~ xmatrix = (0.8370 | 0.2853 0.8431)
~ cmatrix = (7.7626 | -1.4833 7.6902)
~ units=km

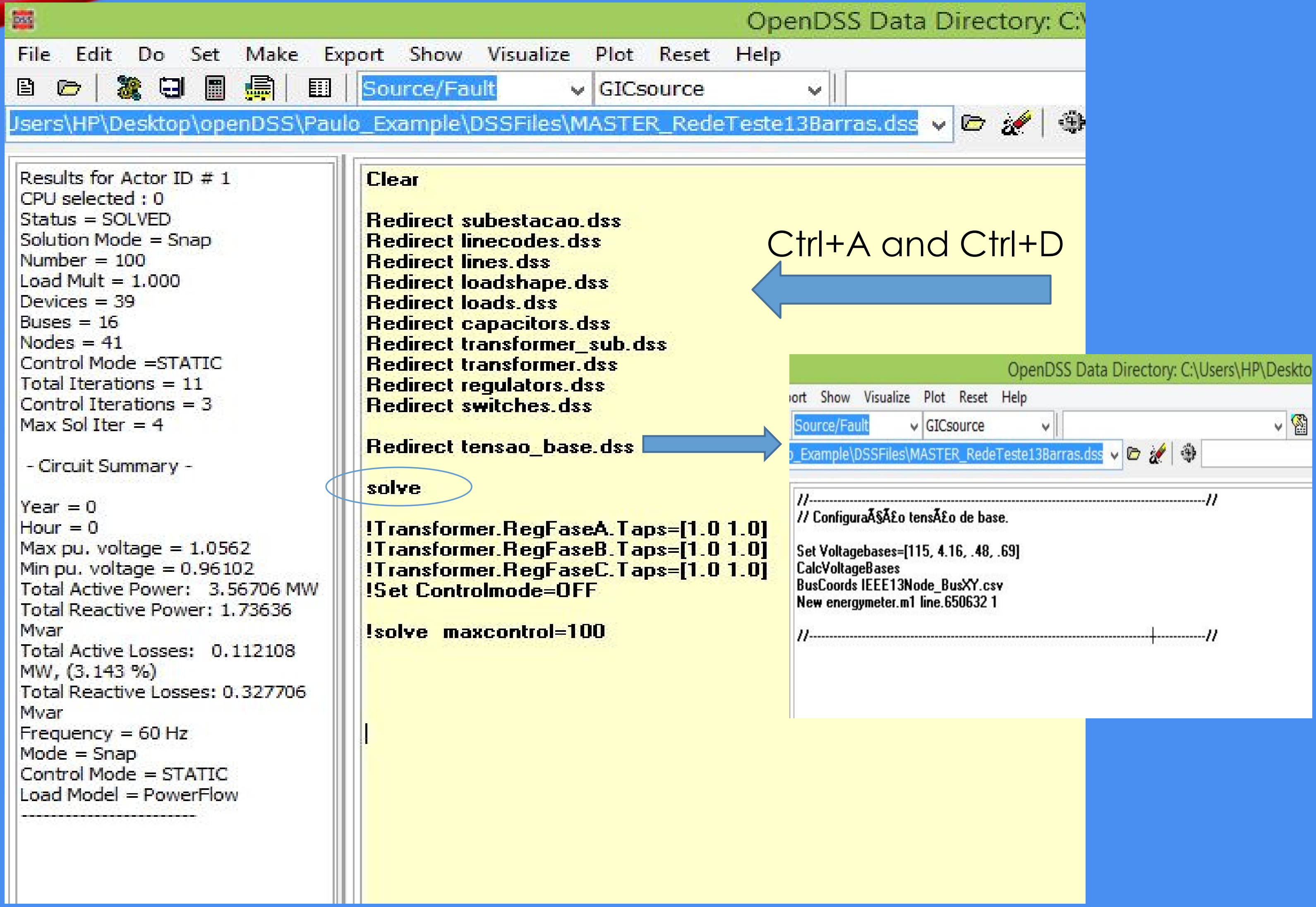
// 604

New linecode.604 nphases=2 BaseFreq=60
~ rmatrix = (0.8226 | 0.1284 0.8261)
~ xmatrix = (0.8431 | 0.2853 0.8370)
~ cmatrix = (7.6902 | -1.4833 7.7626)
~ units=km

// 605

New linecode.605 nphases=1 BaseFreq=60
~ rmatrix = (0.8259)
~ xmatrix = (0.8373)
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\linecodes.dss
```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```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
-------------------------
```

```
Clear

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

solve

!Transformer.RegFaseA.Taps=[1.0 1.0]
!Transformer.RegFaseB.Taps=[1.0 1.0]
!Transformer.RegFaseC.Taps=[1.0 1.0]
!Set Controlmode=OFF

!solve  maxcontrol=100
```

Ctrl+A and Ctrl+D

OpenDSS Data Directory: C:\Users\HP\Deskto
ort
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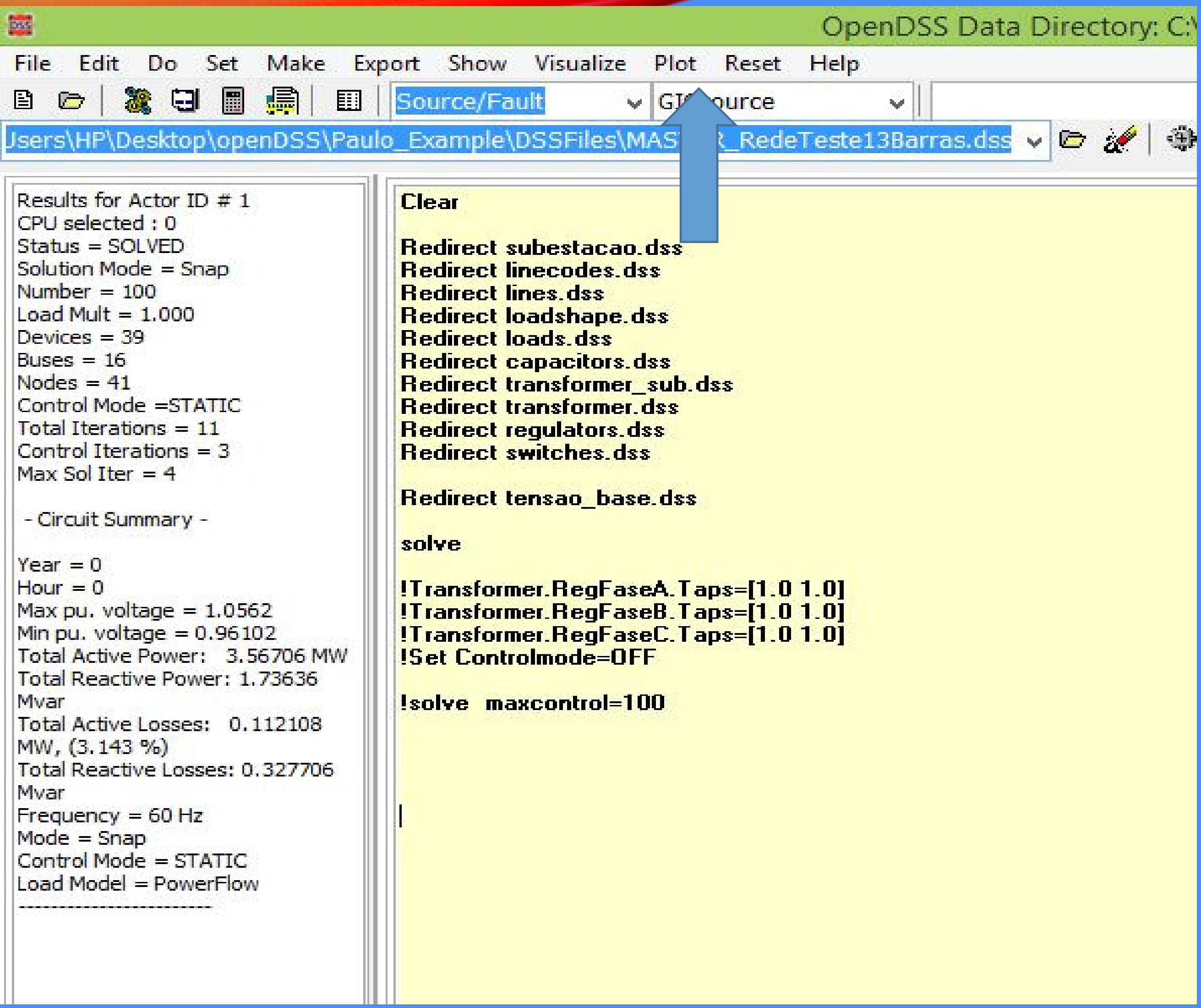
```
//-------------------------------------------------------------------//
// ConfiguraÃ§Ã£o tensÃ£o de base.

Set Voltagebases=[115, 4.16, .48, .69]
CalcVoltageBases
BusCoords IEEE13Node_BusXY.csv
New energymeter.m1 line.650632 1

//-------------------------------------------------------------------//
```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Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MAS
R_RedeTeste13Barras.dss

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

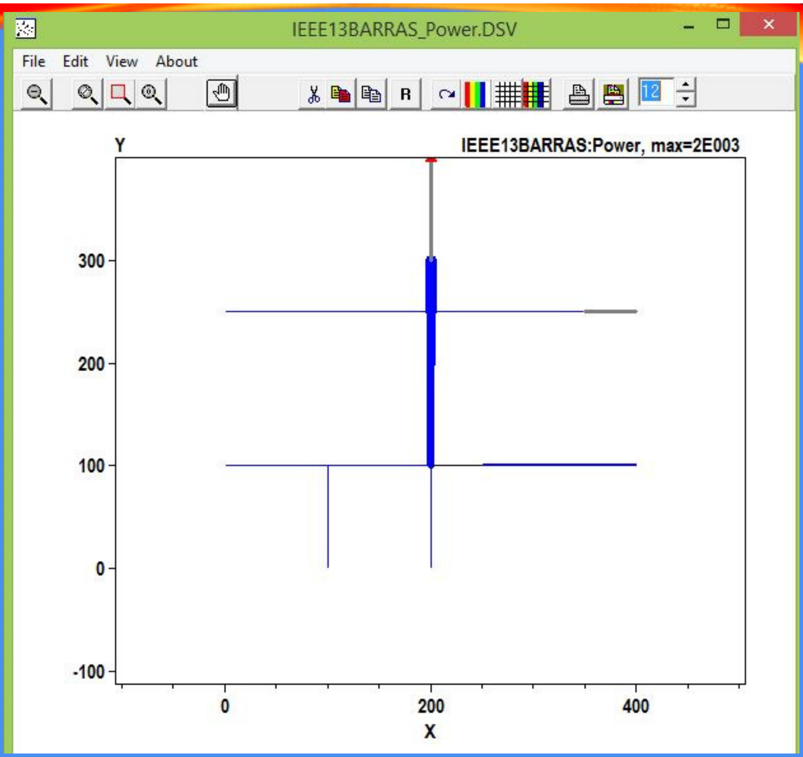
Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

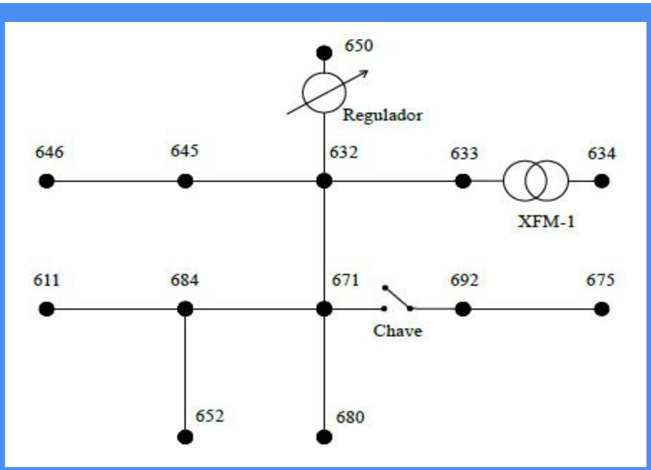
Redirect tensao_base.dss

solve

!Transformer.RegFaseA.Taps=[1.0 1.0]
!Transformer.RegFaseB.Taps=[1.0 1.0]
!Transformer.RegFaseC.Taps=[1.0 1.0]
!Set Controlmode=OFF

!solve  maxcontrol=100
```

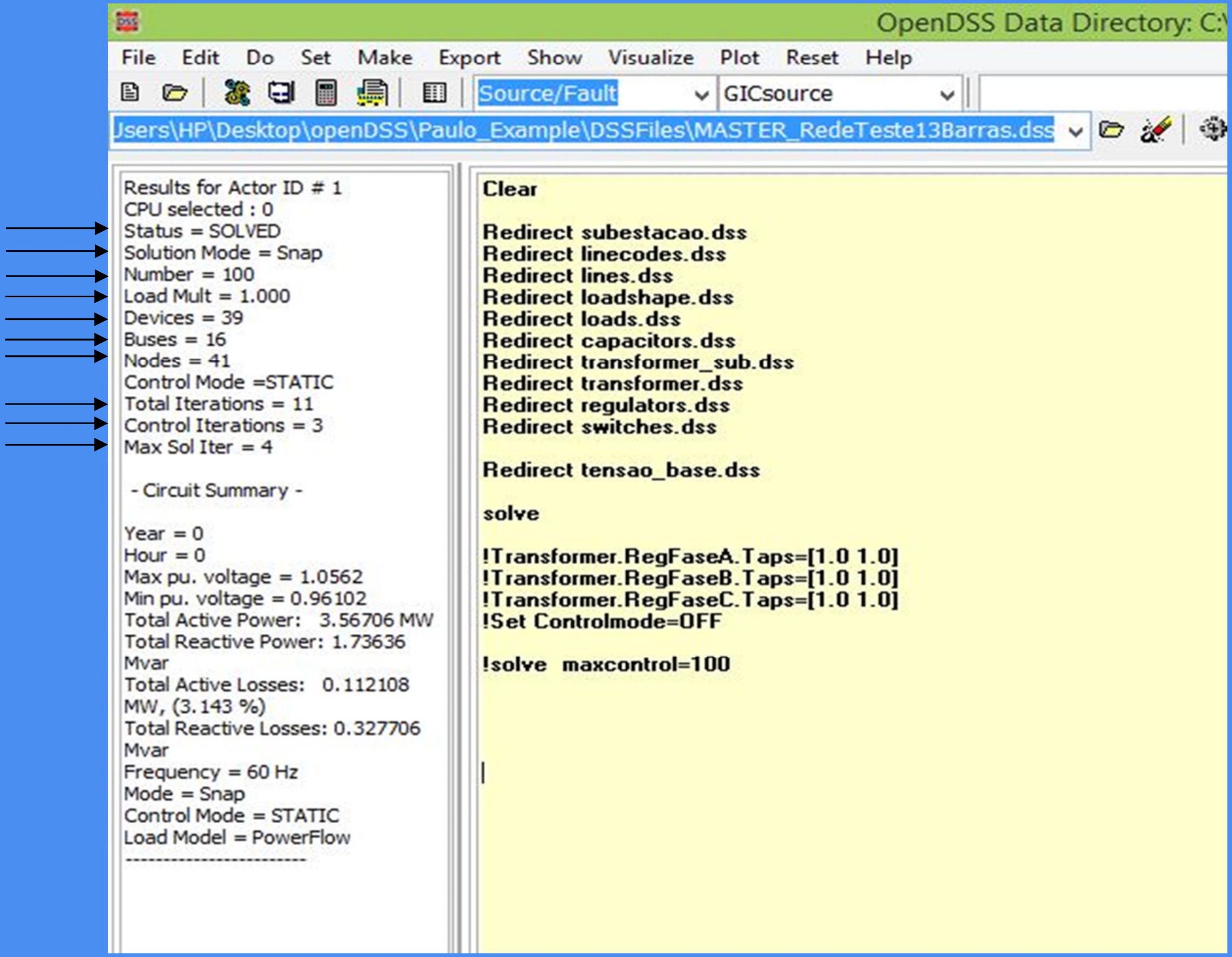



650
Regulador
646
645
632
633
634
XFM-1
611
684
671
692
675
Chave
652
680

ARQUIVO SUMMARY

Este projeto apresenta, inicialmente, a importância da mudança da estrutura atual do setor elétrico brasileiro através da implantação do conceito de redes elétricas inteligentes nos sistemas de distribuição. Nesse cenário é imprescindível a utilização de softwares capazes de dar suporte a essa evolução. No presente trabalho é utilizado o OpenDSS. Com o objetivo de descrever o conteúdo metodológico e verificar as funcionalidades desse software apresenta-se uma forma de construção das matrizes de admitâncias nodais dos elementos de rede, de uma rede completa, a descrição do método utilizado para cálculo de fluxo de potência e, além disso, são apresentados os diferentes modos de cálculo de fluxo de potência e os modelos de geração distribuída disponibilizados pelo software para a simulação da rede teste IEEE 13 barras. Por fim, são apresentados os resultados das simulações realizadas em um sistema de distribuição real com a finalidade de se analisar os níveis de suas tensões. O sistema é modelado no software OpenDSS através de dados fornecidos por uma distribuidora americana de energia elétrica. Esse estudo é realizado em conjunto com o EPRI e tem como principal objetivo atender as demandas de planejamento da distribuidora americana.

ARQUIVO SUMMARY


OpenDSS Data Directory: C:\
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```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

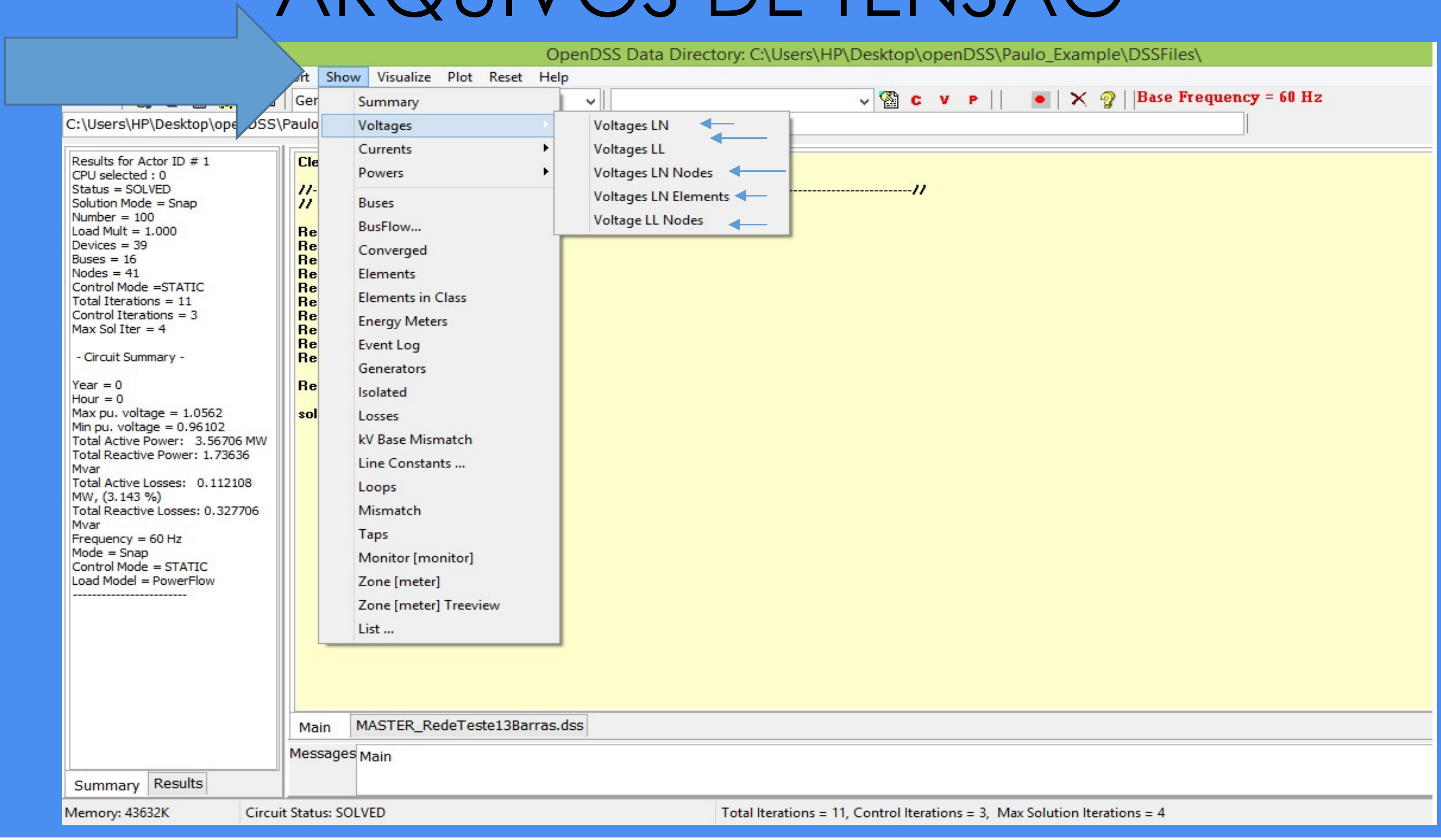
Redirect tensao_base.dss

solve

!Transformer.RegFaseA.Taps=[1.0 1.0]
!Transformer.RegFaseB.Taps=[1.0 1.0]
!Transformer.RegFaseC.Taps=[1.0 1.0]
!Set Controlmode=OFF

!solve  maxcontrol=100
```

ARQUIVOS DE TENSÃO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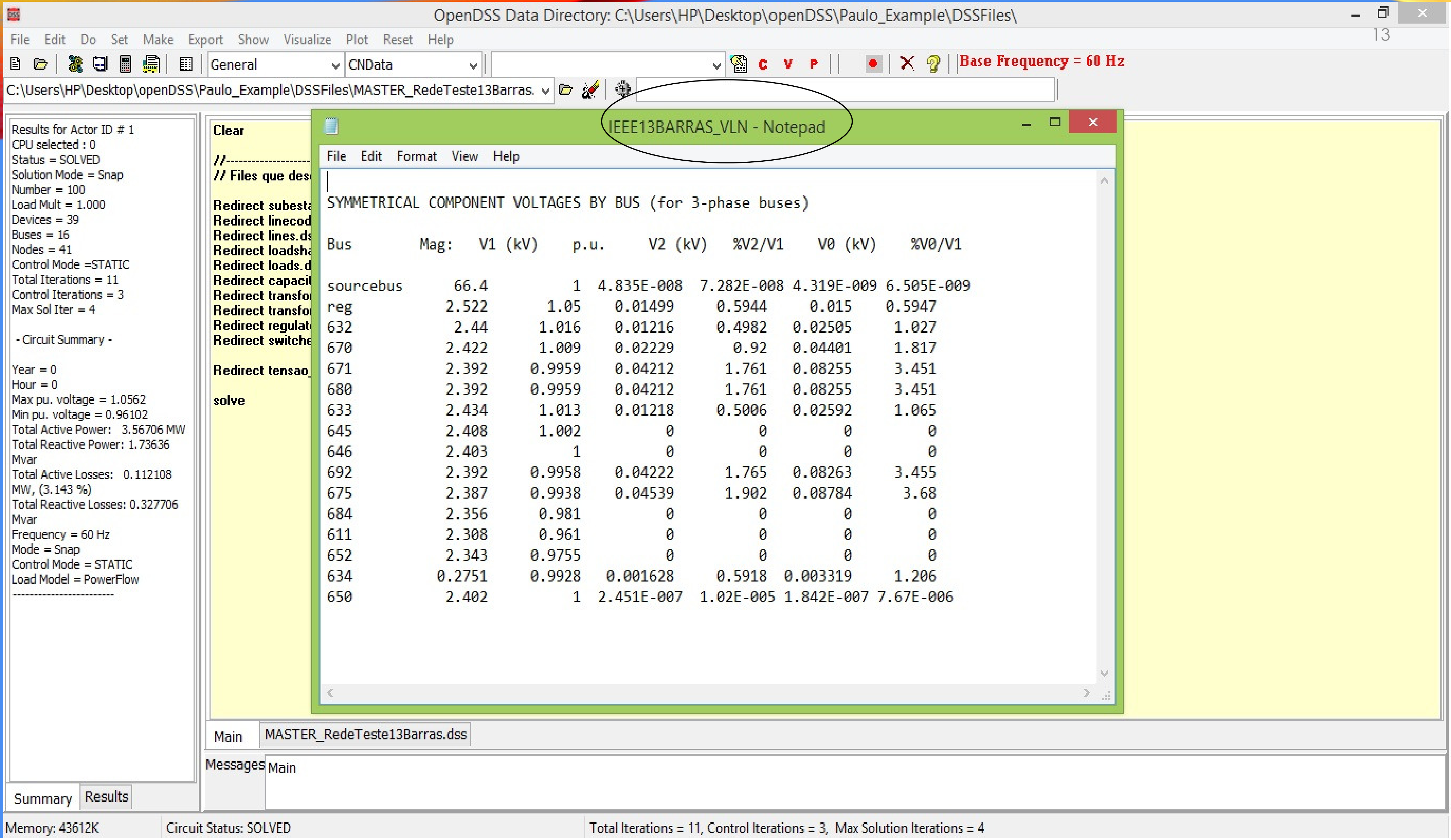
Summary
Voltages
Currents
Powers
Buses
BusFlow...
Converged
Elements
Elements in Class
Energy Meters
Event Log
Generators
Isolated
Losses
kV Base Mismatch
Line Constants ...
Loops
Mismatch
Taps
Monitor [monitor]
Zone [meter]
Zone [meter] Treeview
List ...
Voltages LN
Voltages LL
Voltages LN Nodes
Voltages LN Elements
Voltage LL Nodes
Main
MASTER_RedeTeste13Barras.dss
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Memory: 43632K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
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IEEE13BARRAS_VLN - Notepad
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MASTER_RedeTeste13Barras.dss
Messages
Main
Summary
Results

Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

- Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power: 3.56706 MW
Total Reactive Power: 1.73636 Mvar
Total Active Losses: 0.112108 MW, (3.143 %)
Total Reactive Losses: 0.327706 Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow

```
Clear

//-----------------
// Files que des

Redirect subesta
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Redirect transfo
Redirect transfo
Redirect regulat
Redirect switche

Redirect tensao_

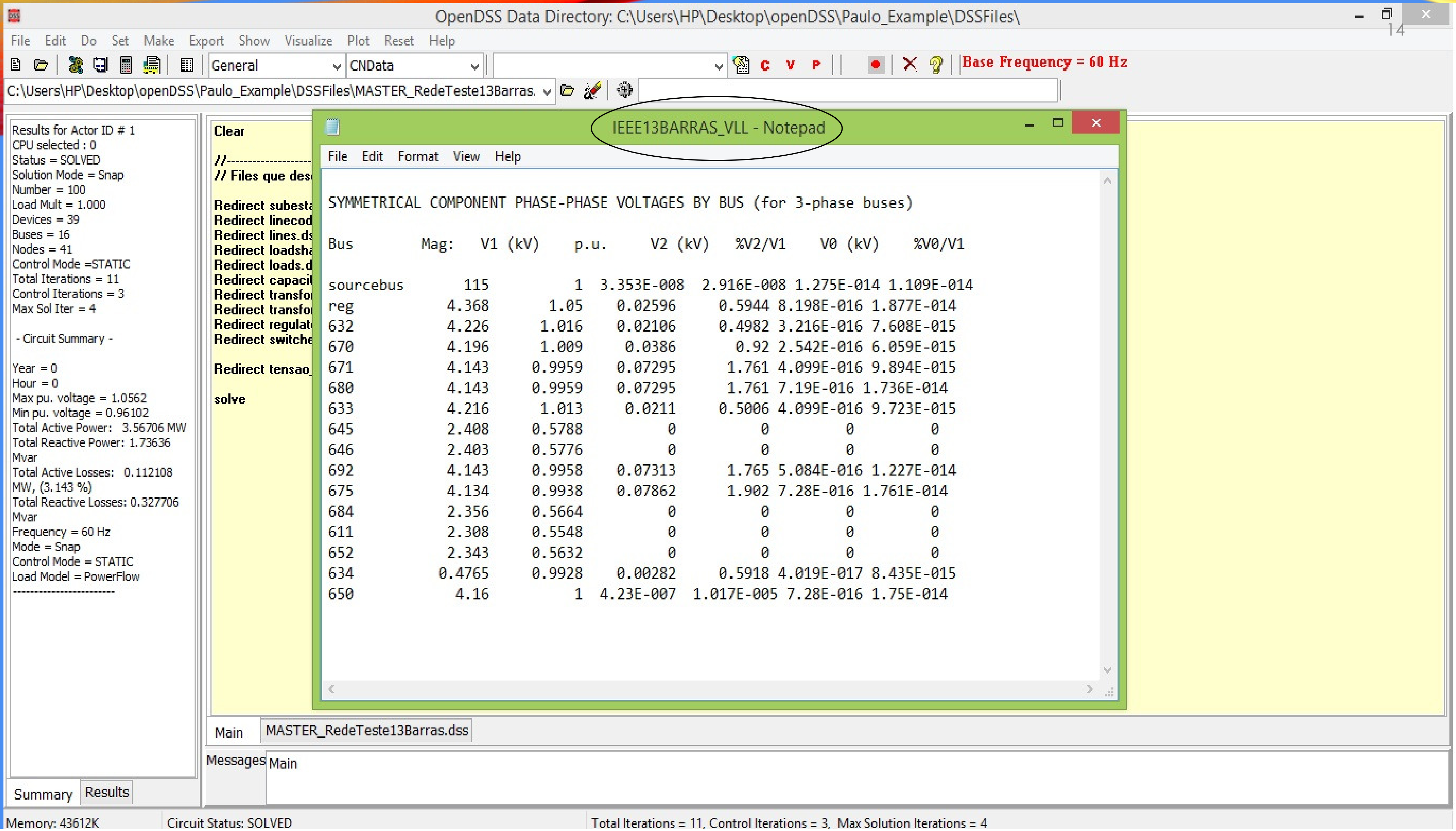
solve
```

```
SYMMETRICAL COMPONENT VOLTAGES BY BUS (for 3-phase buses)

Bus       Mag:   V1 (kV)    p.u.     V2 (kV)   %V2/V1    V0 (kV)    %V0/V1

sourcebus       66.4          1  4.835E-008  7.282E-008 4.319E-009 6.505E-009
reg            2.522       1.05     0.01499     0.5944     0.015     0.5947
632             2.44      1.016     0.01216     0.4982   0.02505      1.027
670            2.422      1.009     0.02229       0.92   0.04401      1.817
671            2.392     0.9959     0.04212      1.761   0.08255      3.451
680            2.392     0.9959     0.04212      1.761   0.08255      3.451
633            2.434      1.013     0.01218     0.5006   0.02592      1.065
645            2.408      1.002           0          0         0          0
646            2.403          1           0          0         0          0
692            2.392     0.9958     0.04222      1.765   0.08263      3.455
675            2.387     0.9938     0.04539      1.902   0.08784       3.68
684            2.356      0.981           0          0         0          0
611            2.308      0.961           0          0         0          0
652            2.343     0.9755           0          0         0          0
634           0.2751     0.9928    0.001628     0.5918  0.003319      1.206
650            2.402          1  2.451E-007  1.02E-005 1.842E-007 7.67E-006
```

Memory: 43612K   Circuit Status: SOLVED   Total Iterations = 11, Control Iterations = 3, Max Solution Iterations = 4


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
CNData
C V P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
IEEE13BARRAS_VLL - Notepad
File Edit Format View Help
Main
MASTER_RedeTeste13Barras.dss
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//-------------------
// Files que des

Redirect subesta
Redirect linecod
Redirect lines.ds
Redirect loadsha
Redirect loads.d
Redirect capacit
Redirect transfor
Redirect transfor
Redirect regulat
Redirect switche

Redirect tensao_

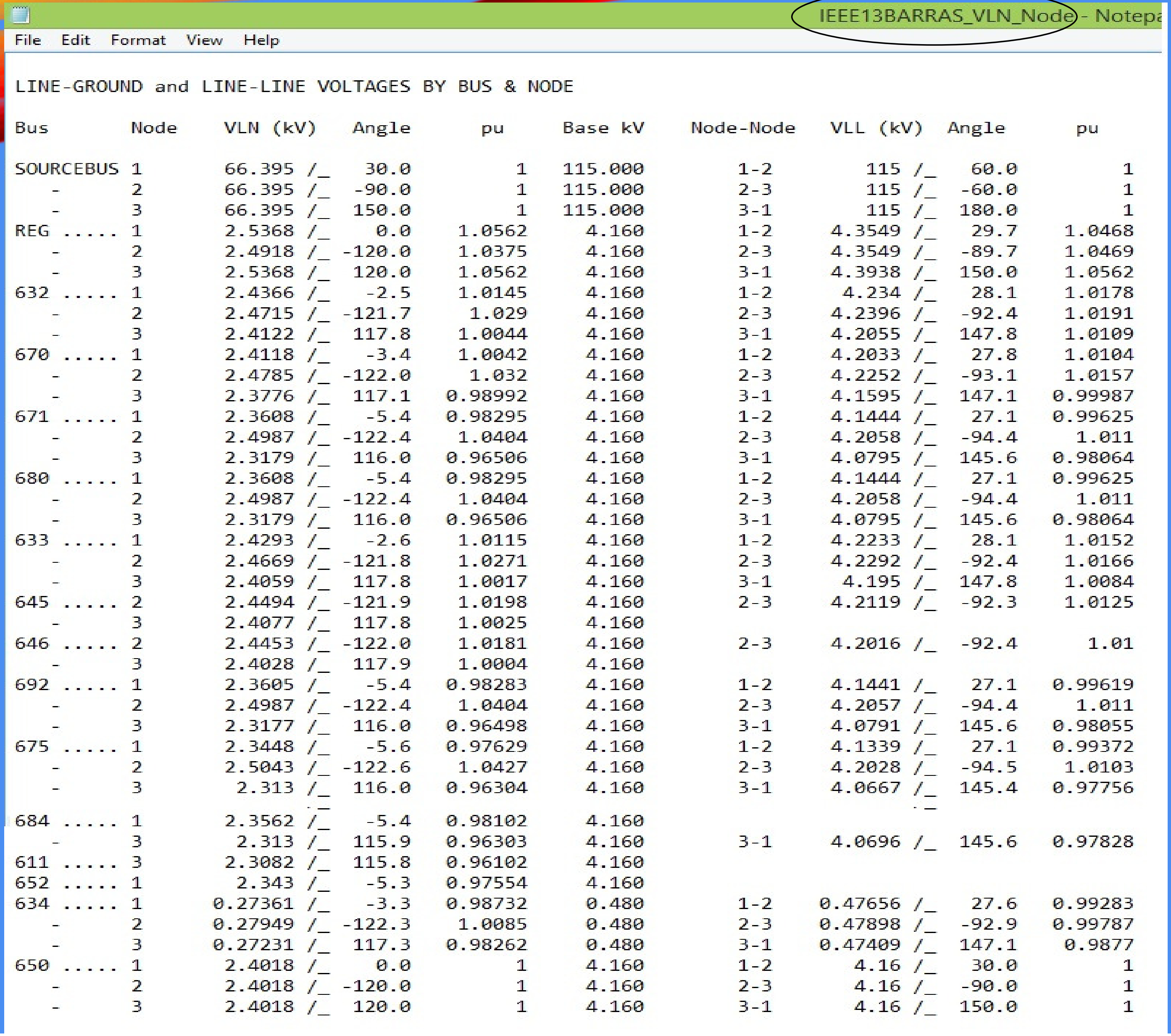
solve
```

```
SYMMETRICAL COMPONENT PHASE-PHASE VOLTAGES BY BUS (for 3-phase buses)

Bus        Mag:   V1 (kV)    p.u.     V2 (kV)   %V2/V1    V0 (kV)    %V0/V1

sourcebus       115          1  3.353E-008  2.916E-008 1.275E-014 1.109E-014
reg           4.368       1.05    0.02596     0.5944 8.198E-016 1.877E-014
632           4.226      1.016    0.02106     0.4982 3.216E-016 7.608E-015
670           4.196      1.009     0.0386       0.92 2.542E-016 6.059E-015
671           4.143     0.9959    0.07295      1.761 4.099E-016 9.894E-015
680           4.143     0.9959    0.07295      1.761 7.19E-016 1.736E-014
633           4.216      1.013     0.0211     0.5006 4.099E-016 9.723E-015
645           2.408     0.5788          0          0          0          0
646           2.403     0.5776          0          0          0          0
692           4.143     0.9958    0.07313      1.765 5.084E-016 1.227E-014
675           4.134     0.9938    0.07862      1.902 7.28E-016 1.761E-014
684           2.356     0.5664          0          0          0          0
611           2.308     0.5548          0          0          0          0
652           2.343     0.5632          0          0          0          0
634          0.4765     0.9928    0.00282     0.5918 4.019E-017 8.435E-015
650            4.16          1  4.23E-007  1.017E-005 7.28E-016 1.75E-014
```

```
Memory: 43612K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```

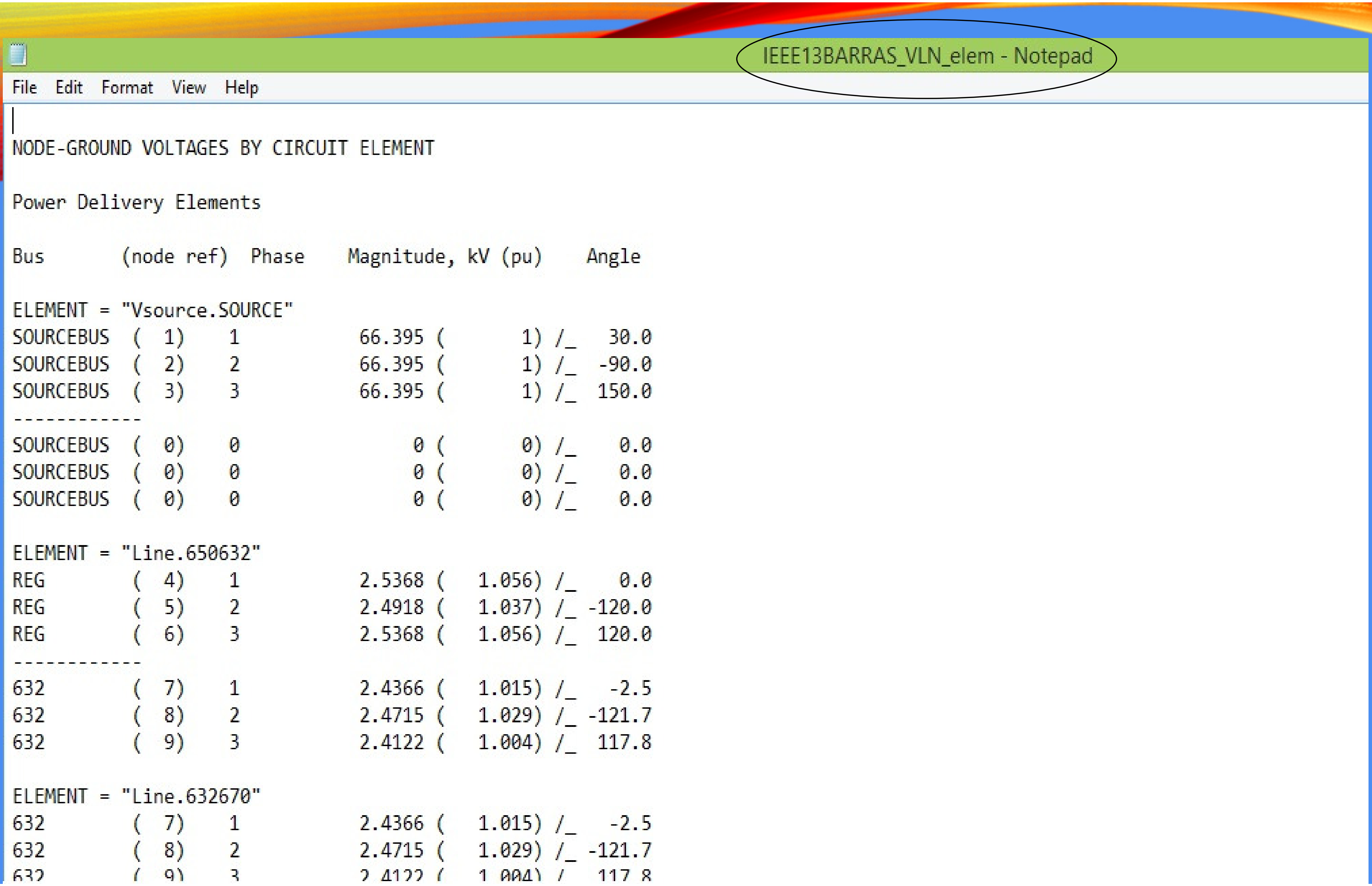


```
LINE-GROUND and LINE-LINE VOLTAGES BY BUS & NODE

Bus          Node      VLN (kV)    Angle        pu     Base kV     Node-Node    VLL (kV)   Angle        pu

SOURCEBUS 1         66.395 /_   30.0         1    115.000        1-2         115 /_   60.0          1
   -      2         66.395 /_  -90.0         1    115.000        2-3         115 /_  -60.0          1
   -      3         66.395 /_  150.0         1    115.000        3-1         115 /_  180.0          1
REG ..... 1         2.5368 /_    0.0    1.0562      4.160        1-2      4.3549 /_   29.7     1.0468
   -      2         2.4918 /_ -120.0    1.0375      4.160        2-3      4.3549 /_  -89.7     1.0469
   -      3         2.5368 /_  120.0    1.0562      4.160        3-1      4.3938 /_  150.0     1.0562
632 ..... 1         2.4366 /_   -2.5    1.0145      4.160        1-2       4.234 /_   28.1     1.0178
   -      2         2.4715 /_ -121.7     1.029      4.160        2-3      4.2396 /_  -92.4     1.0191
   -      3         2.4122 /_  117.8    1.0044      4.160        3-1      4.2055 /_  147.8     1.0109
670 ..... 1         2.4118 /_   -3.4    1.0042      4.160        1-2      4.2033 /_   27.8     1.0104
   -      2         2.4785 /_ -122.0     1.032      4.160        2-3      4.2252 /_  -93.1     1.0157
   -      3         2.3776 /_  117.1   0.98992      4.160        3-1      4.1595 /_  147.1    0.99987
671 ..... 1         2.3608 /_   -5.4   0.98295      4.160        1-2      4.1444 /_   27.1    0.99625
   -      2         2.4987 /_ -122.4    1.0404      4.160        2-3      4.2058 /_  -94.4      1.011
   -      3         2.3179 /_  116.0   0.96506      4.160        3-1      4.0795 /_  145.6    0.98064
680 ..... 1         2.3608 /_   -5.4   0.98295      4.160        1-2      4.1444 /_   27.1    0.99625
   -      2         2.4987 /_ -122.4    1.0404      4.160        2-3      4.2058 /_  -94.4      1.011
   -      3         2.3179 /_  116.0   0.96506      4.160        3-1      4.0795 /_  145.6    0.98064
633 ..... 1         2.4293 /_   -2.6    1.0115      4.160        1-2      4.2233 /_   28.1     1.0152
   -      2         2.4669 /_ -121.8    1.0271      4.160        2-3      4.2292 /_  -92.4     1.0166
   -      3         2.4059 /_  117.8    1.0017      4.160        3-1       4.195 /_  147.8     1.0084
645 ..... 2         2.4494 /_ -121.9    1.0198      4.160        2-3      4.2119 /_  -92.3     1.0125
   -      3         2.4077 /_  117.8    1.0025      4.160
646 ..... 2         2.4453 /_ -122.0    1.0181      4.160        2-3      4.2016 /_  -92.4       1.01
   -      3         2.4028 /_  117.9    1.0004      4.160
692 ..... 1         2.3605 /_   -5.4   0.98283      4.160        1-2      4.1441 /_   27.1    0.99619
   -      2         2.4987 /_ -122.4    1.0404      4.160        2-3      4.2057 /_  -94.4      1.011
   -      3         2.3177 /_  116.0   0.96498      4.160        3-1      4.0791 /_  145.6    0.98055
675 ..... 1         2.3448 /_   -5.6   0.97629      4.160        1-2      4.1339 /_   27.1    0.99372
   -      2         2.5043 /_ -122.6    1.0427      4.160        2-3      4.2028 /_  -94.5     1.0103
   -      3          2.313 /_  116.0   0.96304      4.160        3-1      4.0667 /_  145.4    0.97756

684 ..... 1         2.3562 /_   -5.4   0.98102      4.160
   -      3          2.313 /_  115.9   0.96303      4.160        3-1      4.0696 /_  145.6    0.97828
611 ..... 3         2.3082 /_  115.8   0.96102      4.160
652 ..... 1          2.343 /_   -5.3   0.97554      4.160
634 ..... 1        0.27361 /_   -3.3   0.98732      0.480        1-2     0.47656 /_   27.6    0.99283
   -      2        0.27949 /_ -122.3    1.0085      0.480        2-3     0.47898 /_  -92.9    0.99787
   -      3        0.27231 /_  117.3   0.98262      0.480        3-1     0.47409 /_  147.1     0.9877
650 ..... 1         2.4018 /_    0.0         1      4.160        1-2        4.16 /_   30.0          1
   -      2         2.4018 /_ -120.0         1      4.160        2-3        4.16 /_  -90.0          1
   -      3         2.4018 /_  120.0         1      4.160        3-1        4.16 /_  150.0          1
```


IEEE13BARRAS_VLN_elem - Notepad
File
Edit
Format
View
Help

```
NODE-GROUND VOLTAGES BY CIRCUIT ELEMENT

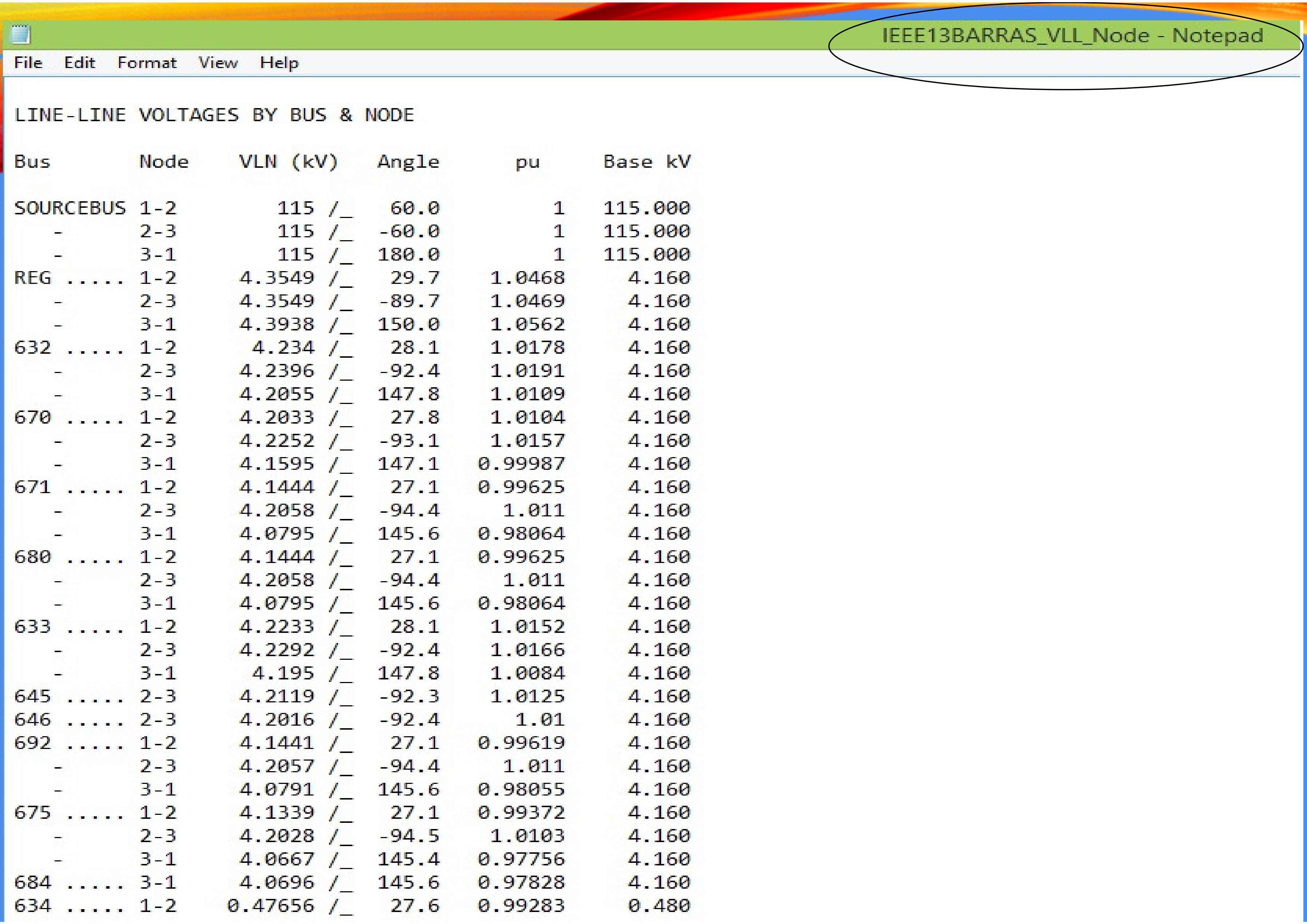
Power Delivery Elements

Bus        (node ref)  Phase    Magnitude, kV (pu)    Angle

ELEMENT = "Vsource.SOURCE"
SOURCEBUS  (  1)    1          66.395 (       1) /_   30.0
SOURCEBUS  (  2)    2          66.395 (       1) /_  -90.0
SOURCEBUS  (  3)    3          66.395 (       1) /_  150.0
------------
SOURCEBUS  (  0)    0               0 (       0) /_    0.0
SOURCEBUS  (  0)    0               0 (       0) /_    0.0
SOURCEBUS  (  0)    0               0 (       0) /_    0.0

ELEMENT = "Line.650632"
REG        (  4)    1          2.5368 (   1.056) /_    0.0
REG        (  5)    2          2.4918 (   1.037) /_ -120.0
REG        (  6)    3          2.5368 (   1.056) /_  120.0
------------
632        (  7)    1          2.4366 (   1.015) /_   -2.5
632        (  8)    2          2.4715 (   1.029) /_ -121.7
632        (  9)    3          2.4122 (   1.004) /_  117.8

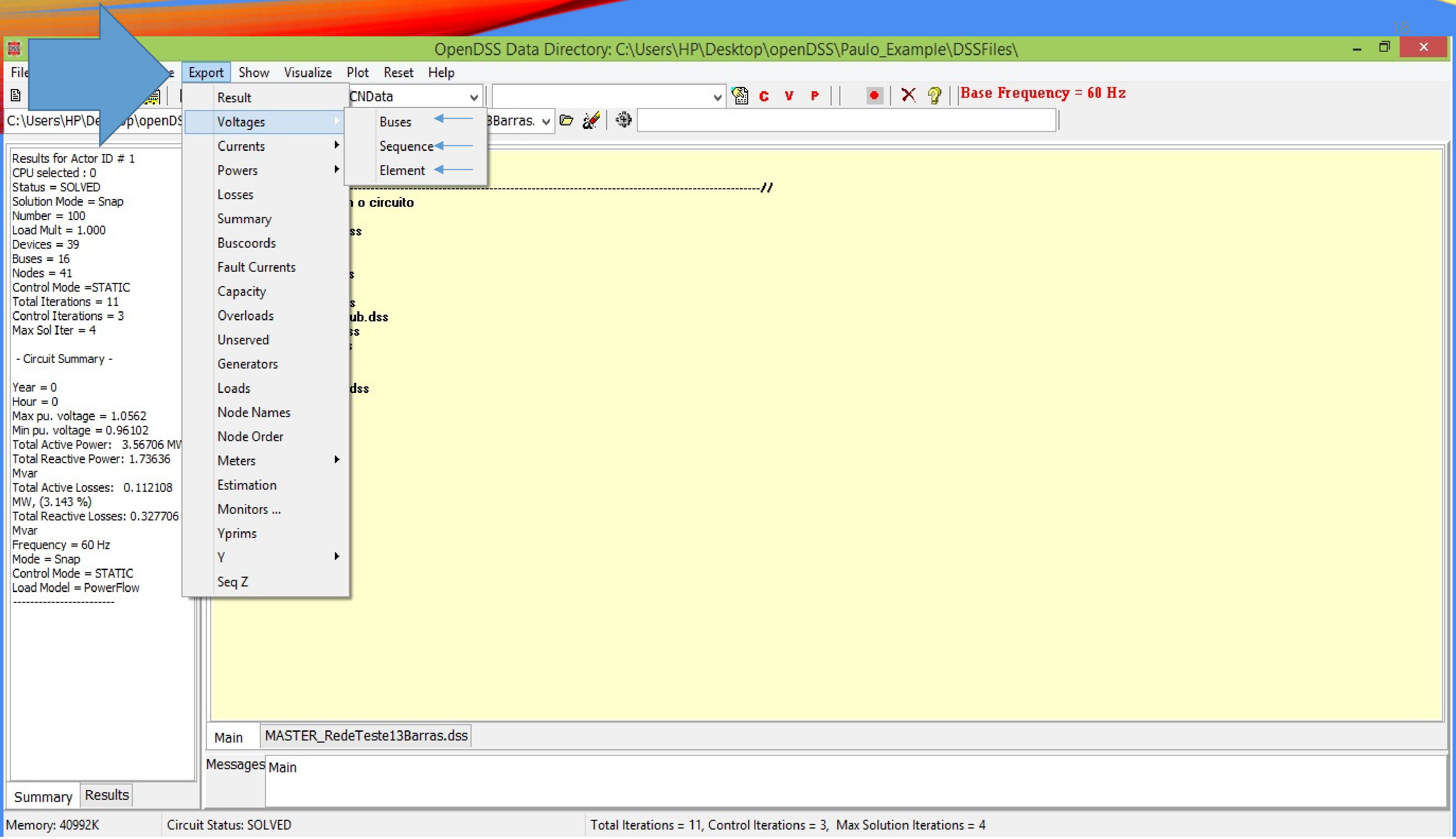
ELEMENT = "Line.632670"
632        (  7)    1          2.4366 (   1.015) /_   -2.5
632        (  8)    2          2.4715 (   1.029) /_ -121.7
632        (  9)    3          2.4122 (   1.004) /_  117.8
```



```
LINE-LINE VOLTAGES BY BUS & NODE

Bus       Node     VLN (kV)   Angle      pu     Base kV

SOURCEBUS 1-2        115 /_   60.0         1   115.000
   -      2-3        115 /_  -60.0         1   115.000
   -      3-1        115 /_  180.0         1   115.000
REG ..... 1-2     4.3549 /_   29.7    1.0468     4.160
   -      2-3     4.3549 /_  -89.7    1.0469     4.160
   -      3-1     4.3938 /_  150.0    1.0562     4.160
632 ..... 1-2      4.234 /_   28.1    1.0178     4.160
   -      2-3     4.2396 /_  -92.4    1.0191     4.160
   -      3-1     4.2055 /_  147.8    1.0109     4.160
670 ..... 1-2     4.2033 /_   27.8    1.0104     4.160
   -      2-3     4.2252 /_  -93.1    1.0157     4.160
   -      3-1     4.1595 /_  147.1   0.99987     4.160
671 ..... 1-2     4.1444 /_   27.1   0.99625     4.160
   -      2-3     4.2058 /_  -94.4     1.011     4.160
   -      3-1     4.0795 /_  145.6   0.98064     4.160
680 ..... 1-2     4.1444 /_   27.1   0.99625     4.160
   -      2-3     4.2058 /_  -94.4     1.011     4.160
   -      3-1     4.0795 /_  145.6   0.98064     4.160
633 ..... 1-2     4.2233 /_   28.1    1.0152     4.160
   -      2-3     4.2292 /_  -92.4    1.0166     4.160
   -      3-1      4.195 /_  147.8    1.0084     4.160
645 ..... 2-3     4.2119 /_  -92.3    1.0125     4.160
646 ..... 2-3     4.2016 /_  -92.4      1.01     4.160
692 ..... 1-2     4.1441 /_   27.1   0.99619     4.160
   -      2-3     4.2057 /_  -94.4     1.011     4.160
   -      3-1     4.0791 /_  145.6   0.98055     4.160
675 ..... 1-2     4.1339 /_   27.1   0.99372     4.160
   -      2-3     4.2028 /_  -94.5    1.0103     4.160
   -      3-1     4.0667 /_  145.4   0.97756     4.160
684 ..... 3-1     4.0696 /_  145.6   0.97828     4.160
634 ..... 1-2    0.47656 /_   27.6   0.99283     0.480
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File
Export
Show
Visualize
Plot
Reset
Help
CNData
Base Frequency = 60 Hz
C:\Users\HP\De p\openDS
3Barras.
Result
Voltages
Currents
Powers
Losses
Summary
Buscoords
Fault Currents
Capacity
Overloads
Unserved
Generators
Loads
Node Names
Node Order
Meters
Estimation
Monitors ...
Yprims
Y
Seq Z
Buses
Sequence
Element
Main
MASTER_RedeTeste13Barras.dss
Messages
Summary
Results

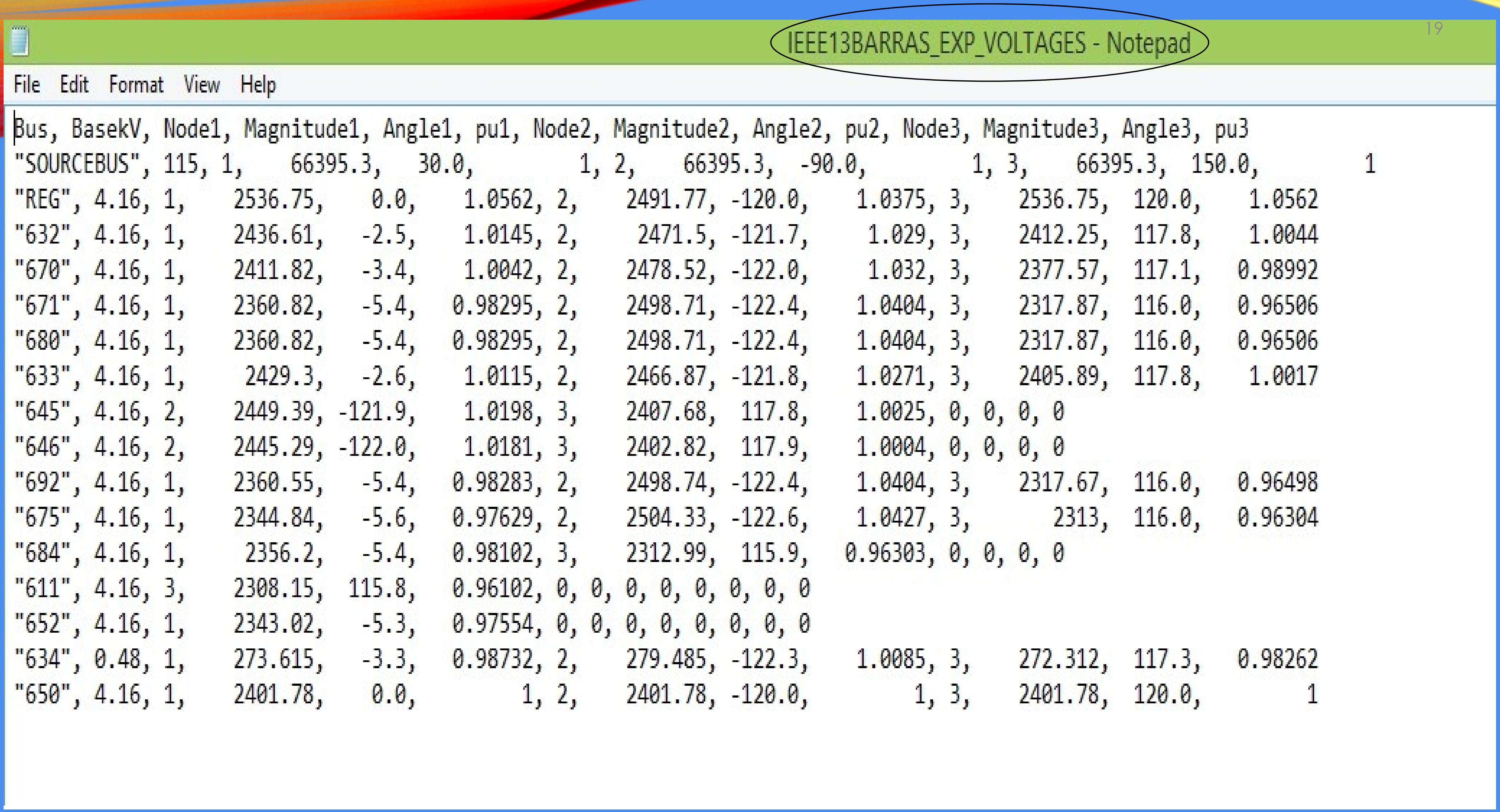
```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MV
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Main
```

```
Memory: 40992K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```



```
Bus, BasekV, Node1, Magnitude1, Angle1, pu1, Node2, Magnitude2, Angle2, pu2, Node3, Magnitude3, Angle3, pu3
"SOURCEBUS", 115, 1,    66395.3,   30.0,          1, 2,    66395.3,  -90.0,          1, 3,    66395.3,  150.0,          1
"REG", 4.16, 1,    2536.75,    0.0,     1.0562, 2,    2491.77, -120.0,     1.0375, 3,    2536.75,  120.0,     1.0562
"632", 4.16, 1,    2436.61,   -2.5,     1.0145, 2,     2471.5, -121.7,      1.029, 3,    2412.25,  117.8,     1.0044
"670", 4.16, 1,    2411.82,   -3.4,     1.0042, 2,    2478.52, -122.0,      1.032, 3,    2377.57,  117.1,    0.98992
"671", 4.16, 1,    2360.82,   -5.4,    0.98295, 2,    2498.71, -122.4,     1.0404, 3,    2317.87,  116.0,    0.96506
"680", 4.16, 1,    2360.82,   -5.4,    0.98295, 2,    2498.71, -122.4,     1.0404, 3,    2317.87,  116.0,    0.96506
"633", 4.16, 1,     2429.3,   -2.6,     1.0115, 2,    2466.87, -121.8,     1.0271, 3,    2405.89,  117.8,     1.0017
"645", 4.16, 2,    2449.39, -121.9,     1.0198, 3,    2407.68,  117.8,     1.0025, 0, 0, 0, 0
"646", 4.16, 2,    2445.29, -122.0,     1.0181, 3,    2402.82,  117.9,     1.0004, 0, 0, 0, 0
"692", 4.16, 1,    2360.55,   -5.4,    0.98283, 2,    2498.74, -122.4,     1.0404, 3,    2317.67,  116.0,    0.96498
"675", 4.16, 1,    2344.84,   -5.6,    0.97629, 2,    2504.33, -122.6,     1.0427, 3,       2313,  116.0,    0.96304
"684", 4.16, 1,     2356.2,   -5.4,    0.98102, 3,    2312.99,  115.9,    0.96303, 0, 0, 0, 0
"611", 4.16, 3,    2308.15,  115.8,    0.96102, 0, 0, 0, 0, 0, 0, 0, 0
"652", 4.16, 1,    2343.02,   -5.3,    0.97554, 0, 0, 0, 0, 0, 0, 0, 0
"634", 0.48, 1,    273.615,   -3.3,    0.98732, 2,    279.485, -122.3,     1.0085, 3,    272.312,  117.3,    0.98262
"650", 4.16, 1,    2401.78,    0.0,          1, 2,    2401.78, -120.0,          1, 3,    2401.78,  120.0,          1
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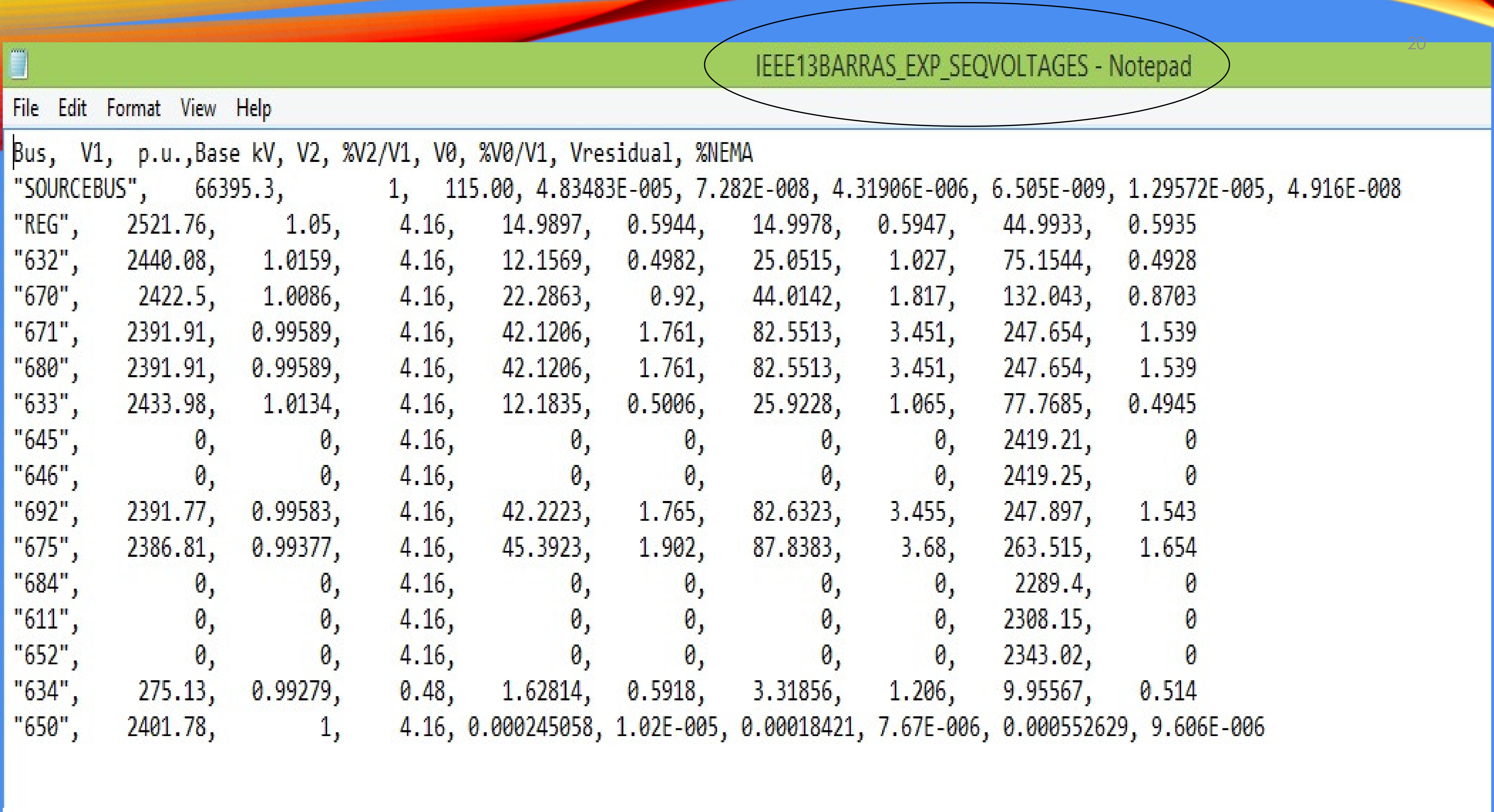

```
Bus,  V1,  p.u.,Base kV, V2, %V2/V1, V0, %V0/V1, Vresidual, %NEMA
"SOURCEBUS",    66395.3,         1,   115.00, 4.83483E-005, 7.282E-008, 4.31906E-006, 6.505E-009, 1.29572E-005, 4.916E-008
"REG",     2521.76,      1.05,     4.16,    14.9897,    0.5944,    14.9978,    0.5947,    44.9933,   0.5935
"632",     2440.08,    1.0159,     4.16,    12.1569,    0.4982,    25.0515,     1.027,    75.1544,   0.4928
"670",      2422.5,    1.0086,     4.16,    22.2863,      0.92,    44.0142,     1.817,    132.043,   0.8703
"671",     2391.91,   0.99589,     4.16,    42.1206,     1.761,    82.5513,     3.451,    247.654,    1.539
"680",     2391.91,   0.99589,     4.16,    42.1206,     1.761,    82.5513,     3.451,    247.654,    1.539
"633",     2433.98,    1.0134,     4.16,    12.1835,    0.5006,    25.9228,     1.065,    77.7685,   0.4945
"645",           0,         0,     4.16,          0,         0,          0,         0,    2419.21,        0
"646",           0,         0,     4.16,          0,         0,          0,         0,    2419.25,        0
"692",     2391.77,   0.99583,     4.16,    42.2223,     1.765,    82.6323,     3.455,    247.897,    1.543
"675",     2386.81,   0.99377,     4.16,    45.3923,     1.902,    87.8383,      3.68,    263.515,    1.654
"684",           0,         0,     4.16,          0,         0,          0,         0,     2289.4,        0
"611",           0,         0,     4.16,          0,         0,          0,         0,    2308.15,        0
"652",           0,         0,     4.16,          0,         0,          0,         0,    2343.02,        0
"634",      275.13,   0.99279,     0.48,    1.62814,    0.5918,    3.31856,     1.206,    9.95567,    0.514
"650",     2401.78,         1,     4.16, 0.000245058, 1.02E-005, 0.00018421, 7.67E-006, 0.000552629, 9.606E-006
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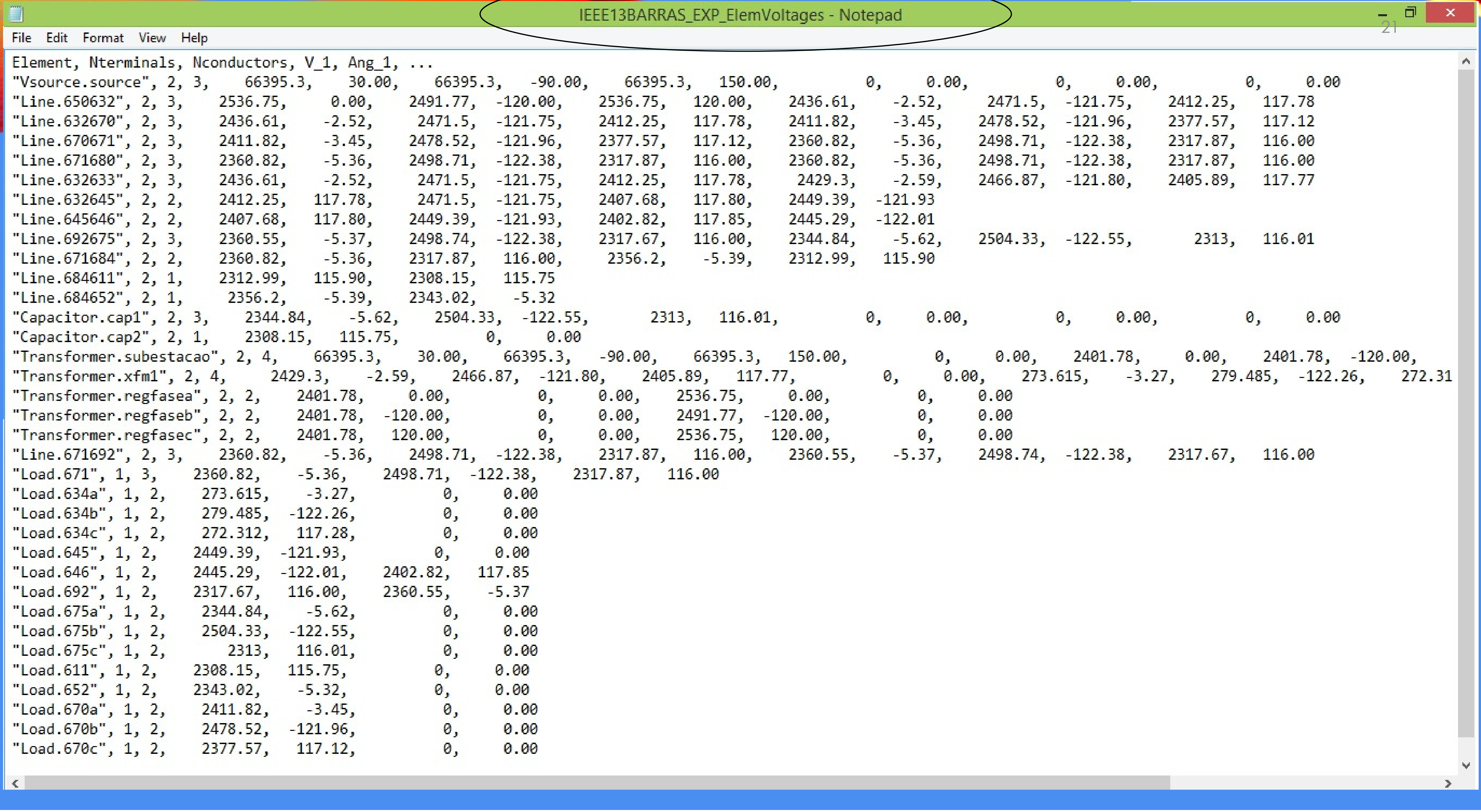

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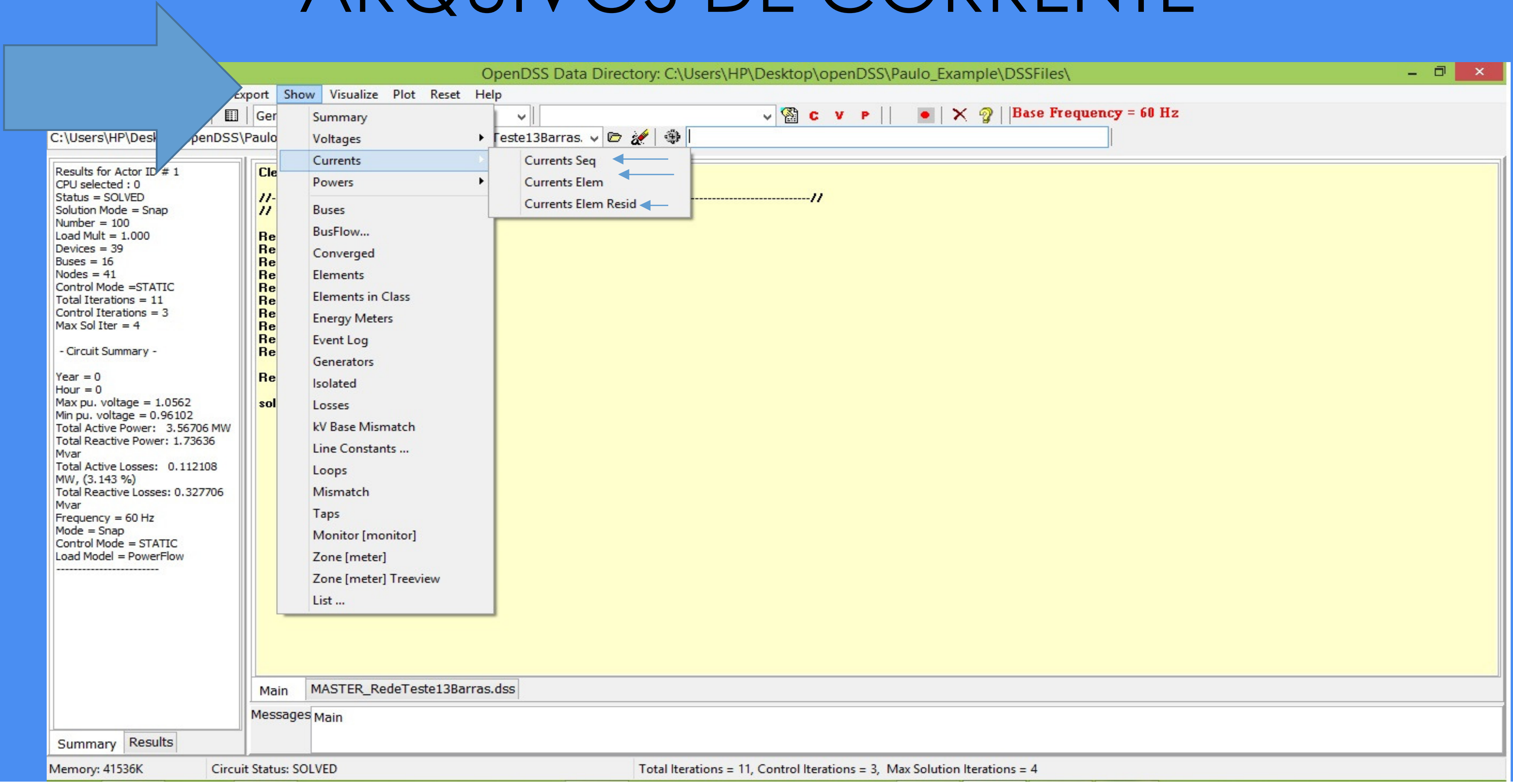
Element, Nterminals, Nconductors, V_1, Ang_1, ...
"Vsource.source", 2, 3,    66395.3,    30.00,    66395.3,   -90.00,    66395.3,   150.00,          0,     0.00,          0,     0.00,          0,     0.00
"Line.650632", 2, 3,    2536.75,     0.00,    2491.77,  -120.00,    2536.75,   120.00,    2436.61,    -2.52,     2471.5,  -121.75,    2412.25,   117.78
"Line.632670", 2, 3,    2436.61,    -2.52,     2471.5,  -121.75,    2412.25,   117.78,    2411.82,    -3.45,    2478.52,  -121.96,    2377.57,   117.12
"Line.670671", 2, 3,    2411.82,    -3.45,    2478.52,  -121.96,    2377.57,   117.12,    2360.82,    -5.36,    2498.71,  -122.38,    2317.87,   116.00
"Line.671680", 2, 3,    2360.82,    -5.36,    2498.71,  -122.38,    2317.87,   116.00,    2360.82,    -5.36,    2498.71,  -122.38,    2317.87,   116.00
"Line.632633", 2, 3,    2436.61,    -2.52,     2471.5,  -121.75,    2412.25,   117.78,     2429.3,    -2.59,    2466.87,  -121.80,    2405.89,   117.77
"Line.632645", 2, 2,    2412.25,   117.78,     2471.5,  -121.75,    2407.68,   117.80,    2449.39,  -121.93
"Line.645646", 2, 2,    2407.68,   117.80,    2449.39,  -121.93,    2402.82,   117.85,    2445.29,  -122.01
"Line.692675", 2, 3,    2360.55,    -5.37,    2498.74,  -122.38,    2317.67,   116.00,    2344.84,    -5.62,    2504.33,  -122.55,       2313,   116.01
"Line.671684", 2, 2,    2360.82,    -5.36,    2317.87,   116.00,     2356.2,    -5.39,    2312.99,   115.90
"Line.684611", 2, 1,    2312.99,   115.90,    2308.15,   115.75
"Line.684652", 2, 1,     2356.2,    -5.39,    2343.02,    -5.32
"Capacitor.cap1", 2, 3,    2344.84,    -5.62,    2504.33,  -122.55,       2313,   116.01,          0,     0.00,          0,     0.00,          0,     0.00
"Capacitor.cap2", 2, 1,    2308.15,   115.75,          0,     0.00
"Transformer.subestacao", 2, 4,    66395.3,    30.00,    66395.3,   -90.00,    66395.3,   150.00,          0,     0.00,    2401.78,     0.00,    2401.78,  -120.00,
"Transformer.xfm1", 2, 4,     2429.3,    -2.59,    2466.87,  -121.80,    2405.89,   117.77,          0,     0.00,    273.615,    -3.27,    279.485,  -122.26,    272.31
"Transformer.regfasea", 2, 2,    2401.78,     0.00,          0,     0.00,    2536.75,     0.00,          0,     0.00
"Transformer.regfaseb", 2, 2,    2401.78,  -120.00,          0,     0.00,    2491.77,  -120.00,          0,     0.00
"Transformer.regfasec", 2, 2,    2401.78,   120.00,          0,     0.00,    2536.75,   120.00,          0,     0.00
"Line.671692", 2, 3,    2360.82,    -5.36,    2498.71,  -122.38,    2317.87,   116.00,    2360.55,    -5.37,    2498.74,  -122.38,    2317.67,   116.00
"Load.671", 1, 3,    2360.82,    -5.36,    2498.71,  -122.38,    2317.87,   116.00
"Load.634a", 1, 2,    273.615,    -3.27,          0,     0.00
"Load.634b", 1, 2,    279.485,  -122.26,          0,     0.00
"Load.634c", 1, 2,    272.312,   117.28,          0,     0.00
"Load.645", 1, 2,    2449.39,  -121.93,          0,     0.00
"Load.646", 1, 2,    2445.29,  -122.01,    2402.82,   117.85
"Load.692", 1, 2,    2317.67,   116.00,    2360.55,    -5.37
"Load.675a", 1, 2,    2344.84,    -5.62,          0,     0.00
"Load.675b", 1, 2,    2504.33,  -122.55,          0,     0.00
"Load.675c", 1, 2,       2313,   116.01,          0,     0.00
"Load.611", 1, 2,    2308.15,   115.75,          0,     0.00
"Load.652", 1, 2,    2343.02,    -5.32,          0,     0.00
"Load.670a", 1, 2,    2411.82,    -3.45,          0,     0.00
"Load.670b", 1, 2,    2478.52,  -121.96,          0,     0.00
"Load.670c", 1, 2,    2377.57,   117.12,          0,     0.00
```

]

ARQUIVOS DE CORRENTE



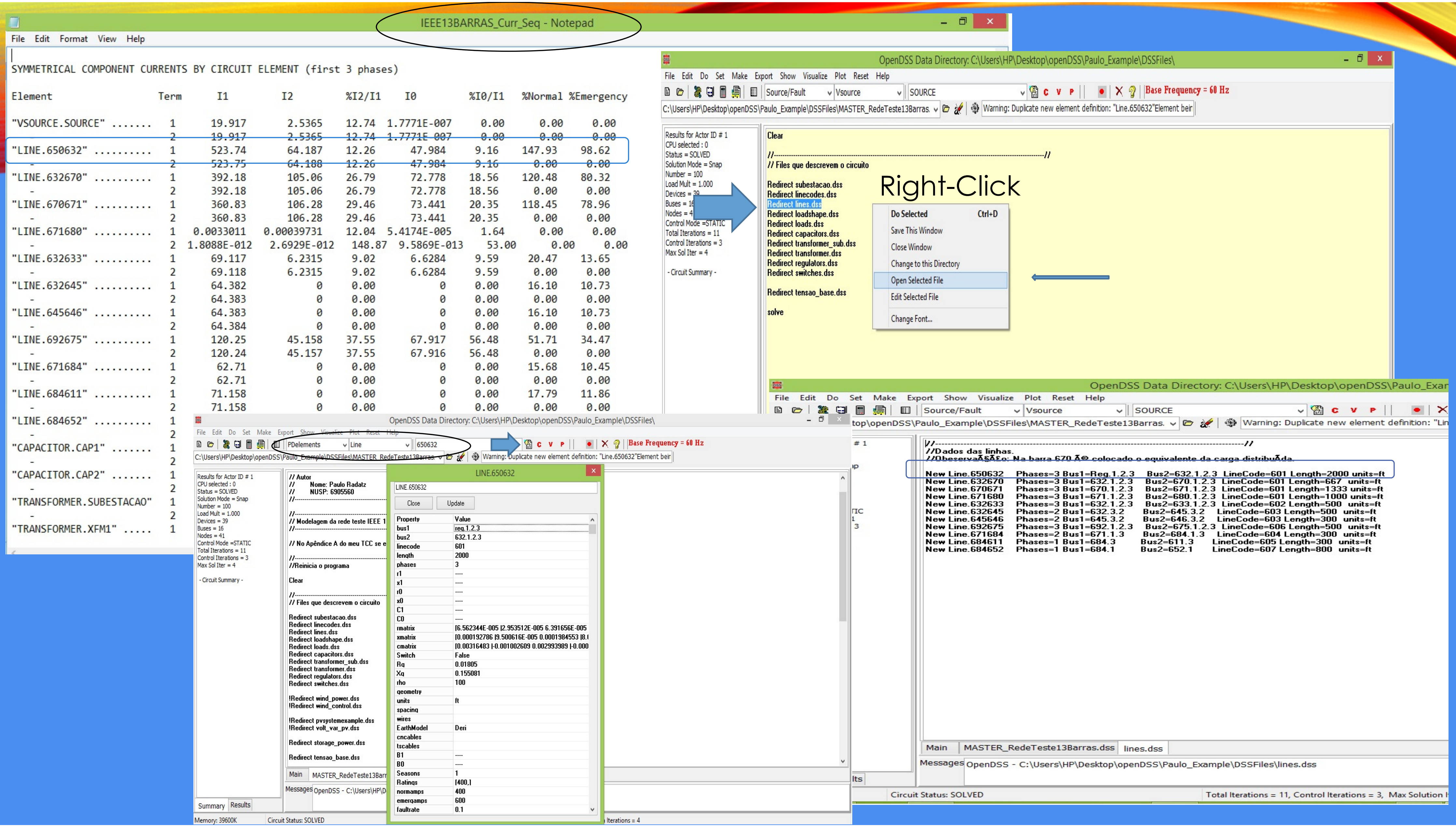
OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
Export
Show
Visualize
Plot
Reset
Help
Base Frequency = 60 Hz
C:\Users\HP\Desk
penDSS\Paulo
Teste13Barras.
Summary
Voltages
Currents
Powers
Buses
BusFlow...
Converged
Elements
Elements in Class
Energy Meters
Event Log
Generators
Isolated
Losses
kV Base Mismatch
Line Constants ...
Loops
Mismatch
Taps
Monitor [monitor]
Zone [meter]
Zone [meter] Treeview
List ...
Currents Seq
Currents Elem
Currents Elem Resid
Main
MASTER_RedeTeste13Barras.dss
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 0
Max pu. voltage = 1.0562
Min pu. voltage = 0.96102
Total Active Power:   3.56706 MW
Total Reactive Power: 1.73636
Mvar
Total Active Losses:   0.112108
MW, (3.143 %)
Total Reactive Losses: 0.327706
Mvar
Frequency = 60 Hz
Mode = Snap
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Memory: 41536K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```


IEEE13BARRAS_Curr_Seq - Notepad
File Edit Format View Help

```
SYMMETRICAL COMPONENT CURRENTS BY CIRCUIT ELEMENT (first 3 phases)

Element                      Term      I1          I2      %I2/I1    I0      %I0/I1   %Normal %Emergency

"VSOURCE.SOURCE" .......      1      19.917      2.5365    12.74  1.7771E-007    0.00      0.00      0.00
                   -          2      19.917      2.5365    12.74  1.7771E-007    0.00      0.00      0.00
"LINE.650632" .........       1      523.74      64.187    12.26     47.984      9.16    147.93     98.62
                   -          2      523.75      64.188    12.26     47.984      9.16      0.00      0.00
"LINE.632670" .........       1      392.18      105.06    26.79     72.778     18.56    120.48     80.32
                   -          2      392.18      105.06    26.79     72.778     18.56      0.00      0.00
"LINE.670671" .........       1      360.83      106.28    29.46     73.441     20.35    118.45     78.96
                   -          2      360.83      106.28    29.46     73.441     20.35      0.00      0.00
"LINE.671680" .........       1   0.0033011  0.00039731    12.04  5.4174E-005      1.64      0.00      0.00
                   -          2  1.8088E-012  2.6929E-012  148.87  9.5869E-013    53.00      0.00      0.00
"LINE.632633" .........       1      69.117      6.2315     9.02     6.6284      9.59     20.47     13.65
                   -          2      69.118      6.2315     9.02     6.6284      9.59      0.00      0.00
"LINE.632645" .........       1      64.382           0     0.00          0      0.00     16.10     10.73
                   -          2      64.383           0     0.00          0      0.00      0.00      0.00
"LINE.645646" .........       1      64.383           0     0.00          0      0.00     16.10     10.73
                   -          2      64.384           0     0.00          0      0.00      0.00      0.00
"LINE.692675" .........       1      120.25      45.158    37.55     67.917     56.48     51.71     34.47
                   -          2      120.24      45.157    37.55     67.916     56.48      0.00      0.00
"LINE.671684" .........       1       62.71           0     0.00          0      0.00     15.68     10.45
                   -          2       62.71           0     0.00          0      0.00      0.00      0.00
"LINE.684611" .........       1      71.158           0     0.00          0      0.00     17.79     11.86
                   -          2      71.158           0     0.00          0      0.00      0.00      0.00
"LINE.684652" .........       1
                   -          2
"CAPACITOR.CAP1" .......      1
                   -          2
"CAPACITOR.CAP2" .......      1
                   -          2
"TRANSFORMER.SUBESTACAO"      1
                   -          2
"TRANSFORMER.XFM1" .....      1
```

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
SOURCE
C V P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Warning: Duplicate new element definition: "Line.650632"Element beir

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Clear

//---------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

solve
```

Right-Click

Do Selected Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
PDelements
Line
650632
C V P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Warning: Duplicate new element definition: "Line.650632"Element beir

```
// Autor
//      Nome: Paulo Radatz
//      NUSP: 6905560
//-----------------------------------------

//-----------------------------------------
// Modelagem da rede teste IEEE 1
//-----------------------------------------

// No Apêndice A do meu TCC se e

//-----------------------------------------
//Reinicia o programa

Clear

//-----------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

Redirect storage_power.dss

Redirect tensao_base.dss
```

Main
MASTER_RedeTeste13Barr
Messages
OpenDSS - C:\Users\HP\D
Summary
Results
Memory: 39600K
Circuit Status: SOLVED
Iterations = 4

LINE.650632

LINE.650632

Close
Update

Property	Value
bus1	reg.1.2.3
bus2	632.1.2.3
linecode	601
length	2000
phases	3
r1	----
x1	----
r0	----
x0	----
C1	----
C0	----
rmatrix	[6.562344E-005 |2.953512E-005 6.391656E-005
xmatrix	[0.000192786 |9.500616E-005 0.0001984553 |8.(
cmatrix	[0.00316483 |-0.001002609 0.002993989 |-0.000
Switch	False
Rg	0.01805
Xg	0.155081
rho	100
geometry	
units	ft
spacing	
wires	
EarthModel	Deri
cncables	
tscables	
B1	----
B0	----
Seasons	1
Ratings	[400,]
normamps	400
emergamps	600
faultrate	0.1

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Exar
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
SOURCE
C V P
top\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Warning: Duplicate new element definition: "Lin

```
//---------------------------------------------------------------------------------------------//
//Dados das linhas.
//ObeservaÃ§Ã£o: Na barra 670 Ã© colocado o equivalente da carga distribuÃda.

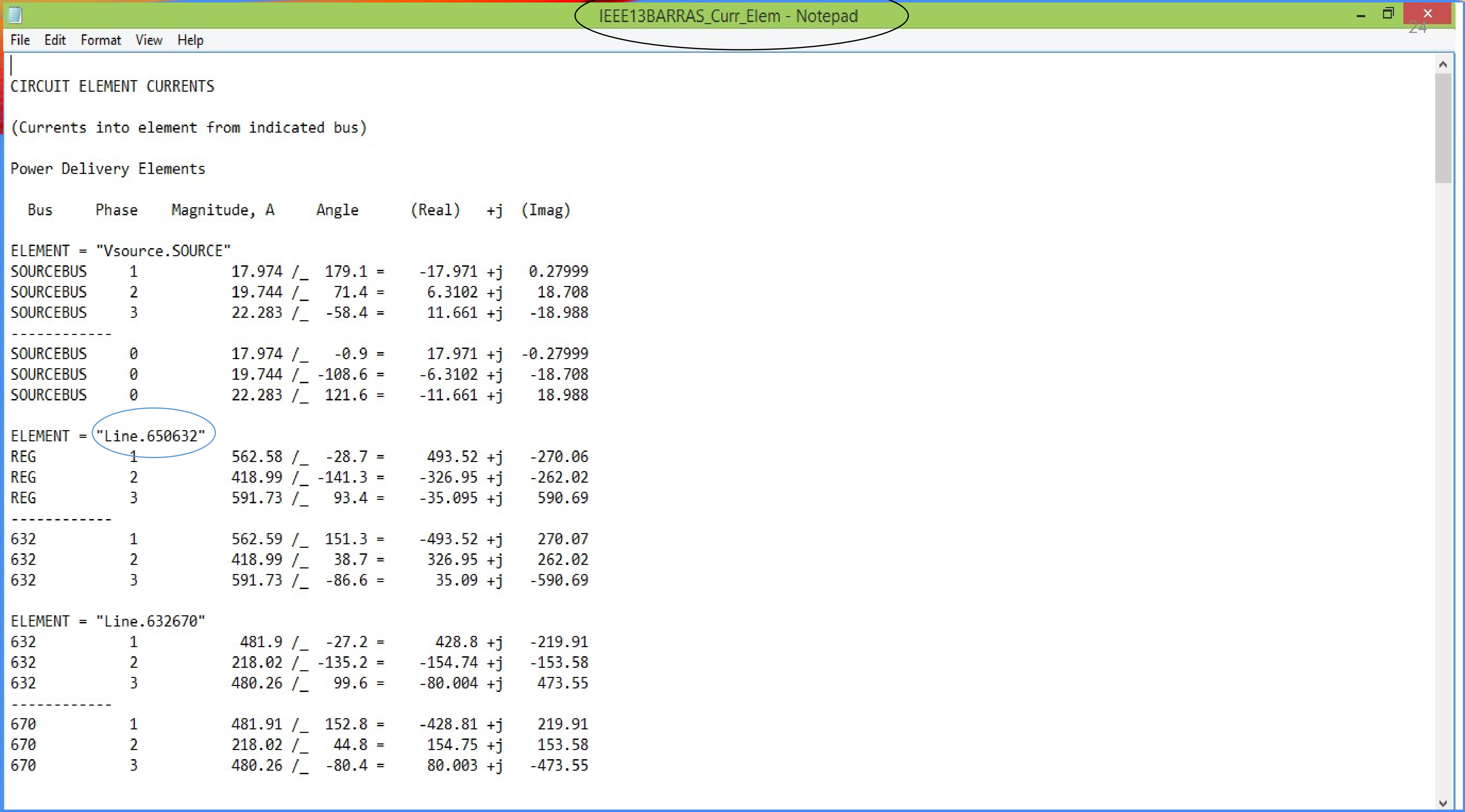
New Line.650632   Phases=3 Bus1=Reg.1.2.3   Bus2=632.1.2.3  LineCode=601 Length=2000 units=ft
New Line.632670   Phases=3 Bus1=632.1.2.3   Bus2=670.1.2.3  LineCode=601 Length=667  units=ft
New Line.670671   Phases=3 Bus1=670.1.2.3   Bus2=671.1.2.3  LineCode=601 Length=1333 units=ft
New Line.671680   Phases=3 Bus1=671.1.2.3   Bus2=680.1.2.3  LineCode=601 Length=1000 units=ft
New Line.632633   Phases=3 Bus1=632.1.2.3   Bus2=633.1.2.3  LineCode=602 Length=500  units=ft
New Line.632645   Phases=2 Bus1=632.3.2     Bus2=645.3.2    LineCode=603 Length=500  units=ft
New Line.645646   Phases=2 Bus1=645.3.2     Bus2=646.3.2    LineCode=603 Length=300  units=ft
New Line.692675   Phases=3 Bus1=692.1.2.3   Bus2=675.1.2.3  LineCode=606 Length=500  units=ft
New Line.671684   Phases=2 Bus1=671.1.3     Bus2=684.1.3    LineCode=604 Length=300  units=ft
New Line.684611   Phases=1 Bus1=684.3       Bus2=611.3      LineCode=605 Length=300  units=ft
New Line.684652   Phases=1 Bus1=684.1       Bus2=652.1      LineCode=607 Length=800  units=ft
```

Main
MASTER_RedeTeste13Barras.dss
lines.dss
Messages

OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\lines.dss

Circuit Status: SOLVED

Total Iterations = 11, Control Iterations = 3, Max Solution I



```
CIRCUIT ELEMENT CURRENTS

(Currents into element from indicated bus)

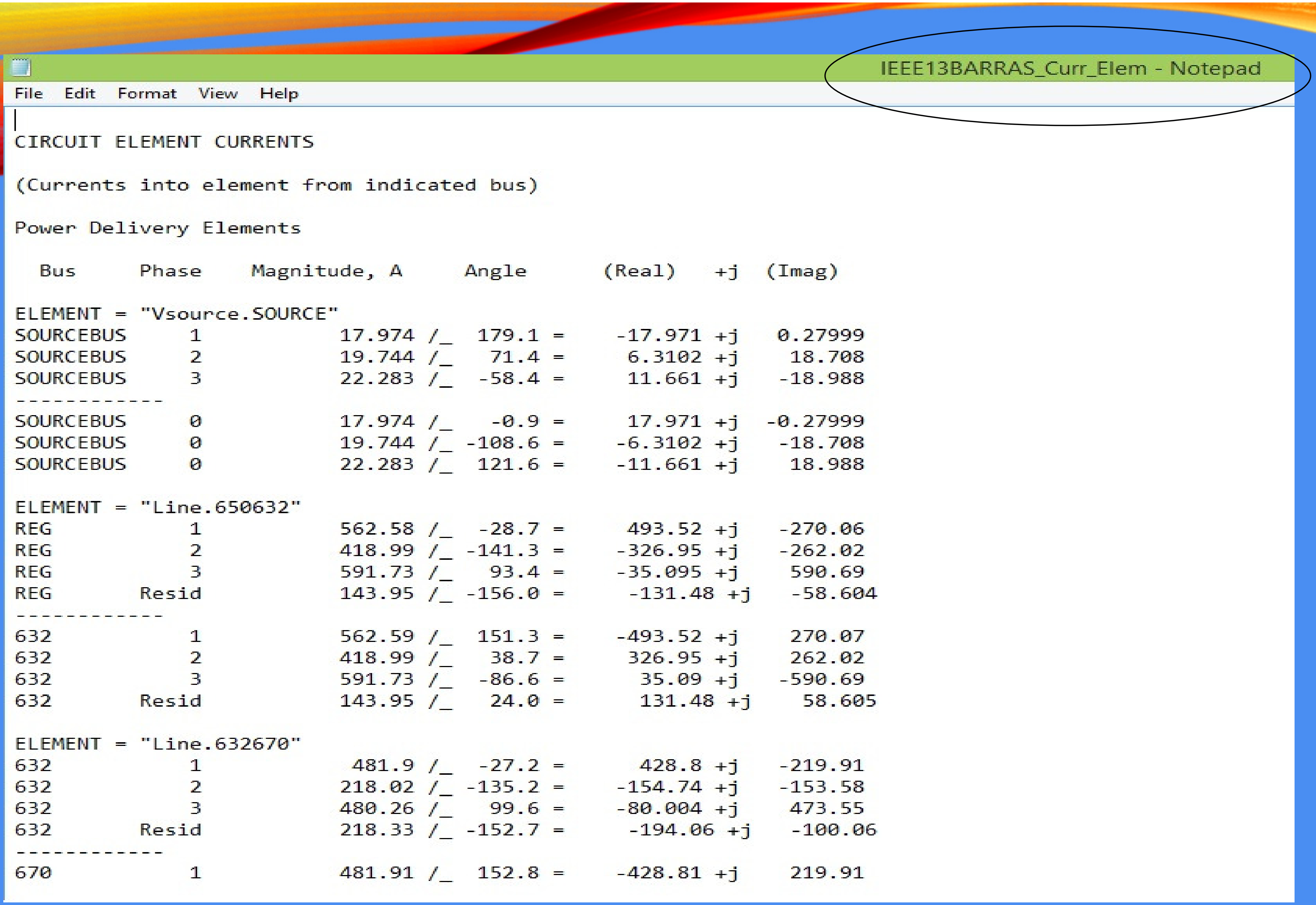
Power Delivery Elements

  Bus     Phase    Magnitude, A     Angle      (Real)   +j  (Imag)

ELEMENT = "Vsource.SOURCE"
SOURCEBUS     1            17.974 /_  179.1 =    -17.971 +j   0.27999
SOURCEBUS     2            19.744 /_   71.4 =     6.3102 +j    18.708
SOURCEBUS     3            22.283 /_  -58.4 =     11.661 +j   -18.988
------------
SOURCEBUS     0            17.974 /_   -0.9 =     17.971 +j  -0.27999
SOURCEBUS     0            19.744 /_ -108.6 =    -6.3102 +j   -18.708
SOURCEBUS     0            22.283 /_  121.6 =    -11.661 +j    18.988

ELEMENT = "Line.650632"
REG           1            562.58 /_  -28.7 =     493.52 +j   -270.06
REG           2            418.99 /_ -141.3 =    -326.95 +j   -262.02
REG           3            591.73 /_   93.4 =    -35.095 +j    590.69
------------
632           1            562.59 /_  151.3 =    -493.52 +j    270.07
632           2            418.99 /_   38.7 =     326.95 +j    262.02
632           3            591.73 /_  -86.6 =      35.09 +j   -590.69

ELEMENT = "Line.632670"
632           1             481.9 /_  -27.2 =      428.8 +j   -219.91
632           2            218.02 /_ -135.2 =    -154.74 +j   -153.58
632           3            480.26 /_   99.6 =    -80.004 +j    473.55
------------
670           1            481.91 /_  152.8 =    -428.81 +j    219.91
670           2            218.02 /_   44.8 =     154.75 +j    153.58
670           3            480.26 /_  -80.4 =     80.003 +j   -473.55
```



```
CIRCUIT ELEMENT CURRENTS

(Currents into element from indicated bus)

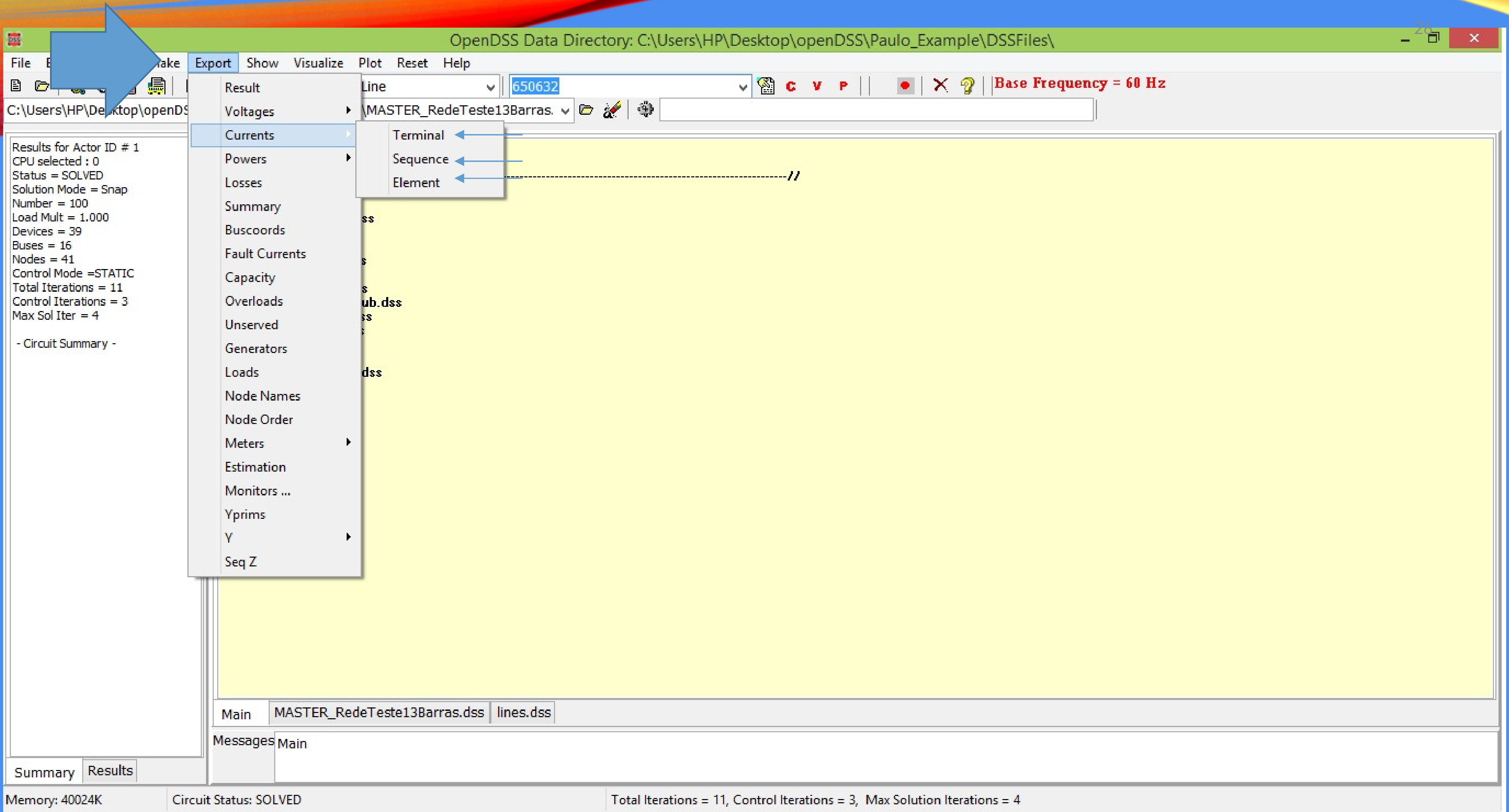
Power Delivery Elements

  Bus       Phase    Magnitude, A     Angle      (Real)   +j  (Imag)

ELEMENT = "Vsource.SOURCE"
SOURCEBUS      1           17.974 /_  179.1 =    -17.971 +j   0.27999
SOURCEBUS      2           19.744 /_   71.4 =     6.3102 +j    18.708
SOURCEBUS      3           22.283 /_  -58.4 =     11.661 +j   -18.988
------------
SOURCEBUS      0           17.974 /_   -0.9 =     17.971 +j  -0.27999
SOURCEBUS      0           19.744 /_ -108.6 =    -6.3102 +j   -18.708
SOURCEBUS      0           22.283 /_  121.6 =    -11.661 +j    18.988

ELEMENT = "Line.650632"
REG            1           562.58 /_  -28.7 =     493.52 +j   -270.06
REG            2           418.99 /_ -141.3 =    -326.95 +j   -262.02
REG            3           591.73 /_   93.4 =    -35.095 +j    590.69
REG         Resid          143.95 /_ -156.0 =     -131.48 +j   -58.604
------------
632            1           562.59 /_  151.3 =    -493.52 +j    270.07
632            2           418.99 /_   38.7 =     326.95 +j    262.02
632            3           591.73 /_  -86.6 =      35.09 +j   -590.69
632         Resid          143.95 /_   24.0 =      131.48 +j    58.605

ELEMENT = "Line.632670"
632            1            481.9 /_  -27.2 =      428.8 +j   -219.91
632            2           218.02 /_ -135.2 =    -154.74 +j   -153.58
632            3           480.26 /_   99.6 =    -80.004 +j    473.55
632         Resid          218.33 /_ -152.7 =     -194.06 +j   -100.06
------------
670            1           481.91 /_  152.8 =    -428.81 +j    219.91
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File
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Line
650632
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Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDS
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Result
Voltages
Currents
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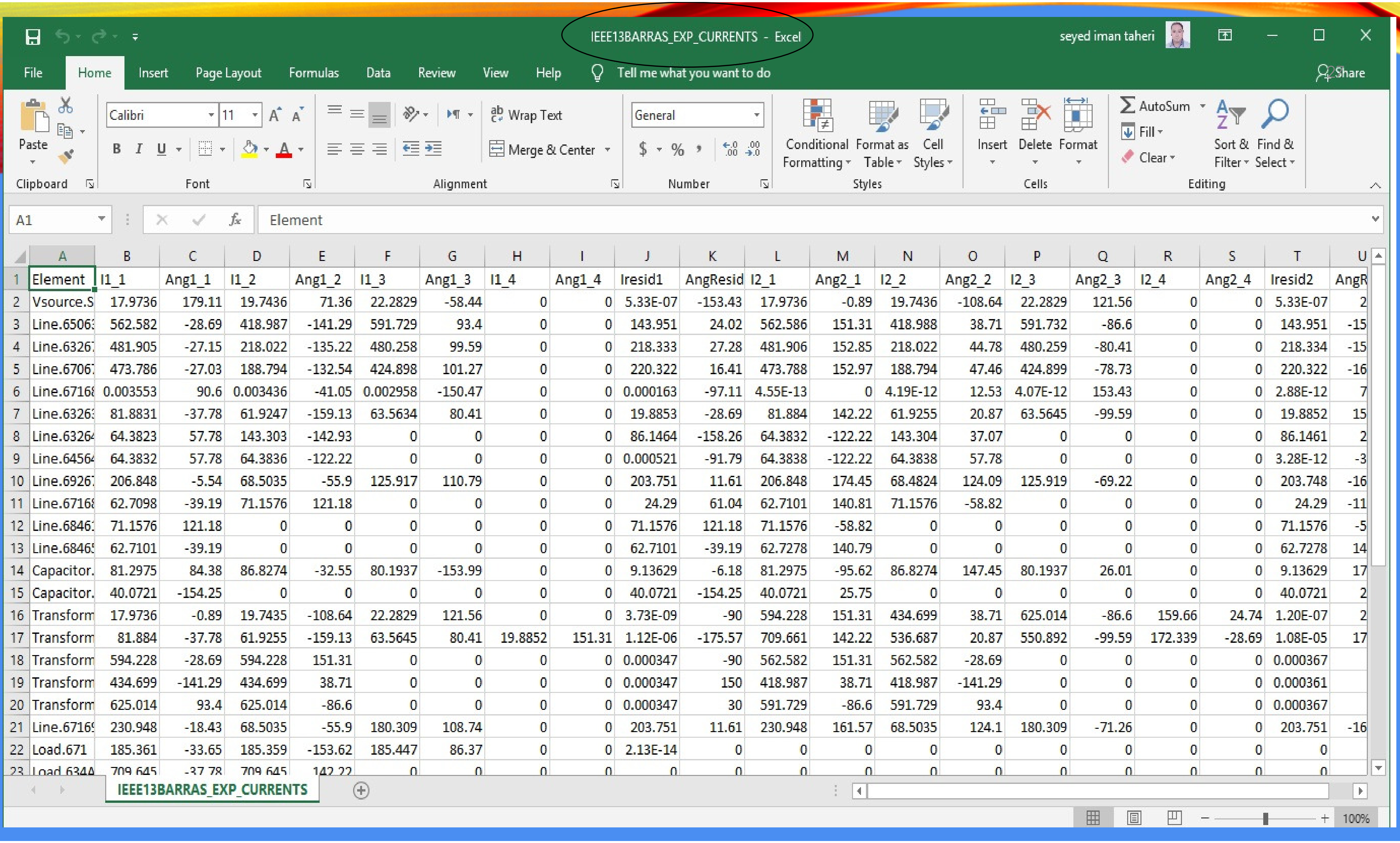
Losses
Summary
Buscoords
Fault Currents
Capacity
Overloads
Unserved
Generators
Loads
Node Names
Node Order
Meters
Estimation
Monitors ...
Yprims
Y
Seq Z
Terminal
Sequence
Element
Main
MASTER_RedeTeste13Barras.dss
lines.dss
Messages
Summary
Results

Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

- Circuit Summary -

Main

Memory: 40024K
Circuit Status: SOLVED
Total Iterations = 11, Control Iterations = 3, Max Solution Iterations = 4


IEEE13BARRAS_EXP_CURRENTS - Excel
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View
Help
Tell me what you want to do
Share
Paste
Clipboard
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Font
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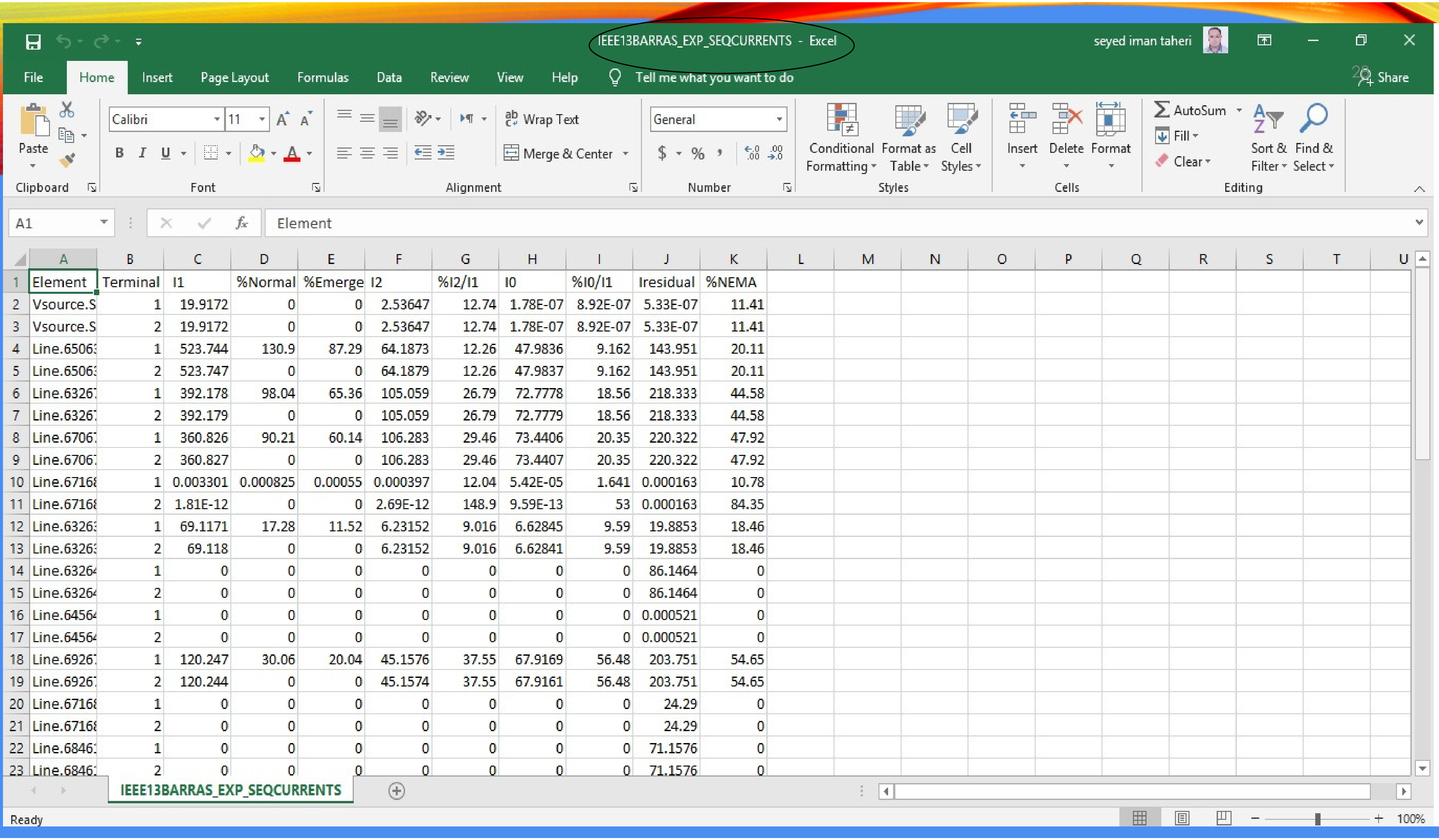
Merge & Center
Alignment
General
Number
Conditional Formatting
Format as Table
Cell Styles
Styles
Insert
Delete
Format
Cells
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Editing
A1
Element
IEEE13BARRAS_EXP_CURRENTS
100%

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Element	I1_1	Ang1_1	I1_2	Ang1_2	I1_3	Ang1_3	I1_4	Ang1_4	Iresid1	AngResid	I2_1	Ang2_1	I2_2	Ang2_2	I2_3	Ang2_3	I2_4	Ang2_4	Iresid2	AngR
2	Vsource.S	17.9736	179.11	19.7436	71.36	22.2829	-58.44	0	0	5.33E-07	-153.43	17.9736	-0.89	19.7436	-108.64	22.2829	121.56	0	0	5.33E-07	2
3	Line.6506	562.582	-28.69	418.987	-141.29	591.729	93.4	0	0	143.951	24.02	562.586	151.31	418.988	38.71	591.732	-86.6	0	0	143.951	-15
4	Line.6326	481.905	-27.15	218.022	-135.22	480.258	99.59	0	0	218.333	27.28	481.906	152.85	218.022	44.78	480.259	-80.41	0	0	218.334	-15
5	Line.6706	473.786	-27.03	188.794	-132.54	424.898	101.27	0	0	220.322	16.41	473.788	152.97	188.794	47.46	424.899	-78.73	0	0	220.322	-16
6	Line.6716	0.003553	90.6	0.003436	-41.05	0.002958	-150.47	0	0	0.000163	-97.11	4.55E-13	0	4.19E-12	12.53	4.07E-12	153.43	0	0	2.88E-12	7
7	Line.6326	81.8831	-37.78	61.9247	-159.13	63.5634	80.41	0	0	19.8853	-28.69	81.884	142.22	61.9255	20.87	63.5645	-99.59	0	0	19.8852	15
8	Line.6326	64.3823	57.78	143.303	-142.93	0	0	0	0	86.1464	-158.26	64.3832	-122.22	143.304	37.07	0	0	0	0	86.1461	2
9	Line.6456	64.3832	57.78	64.3836	-122.22	0	0	0	0	0.000521	-91.79	64.3838	-122.22	64.3838	57.78	0	0	0	0	3.28E-12	-3
10	Line.6926	206.848	-5.54	68.5035	-55.9	125.917	110.79	0	0	203.751	11.61	206.848	174.45	68.4824	124.09	125.919	-69.22	0	0	203.748	-16
11	Line.6716	62.7098	-39.19	71.1576	121.18	0	0	0	0	24.29	61.04	62.7101	140.81	71.1576	-58.82	0	0	0	0	24.29	-11
12	Line.6846	71.1576	121.18	0	0	0	0	0	0	71.1576	121.18	71.1576	-58.82	0	0	0	0	0	0	71.1576	-5
13	Line.6846	62.7101	-39.19	0	0	0	0	0	0	62.7101	-39.19	62.7278	140.79	0	0	0	0	0	0	62.7278	14
14	Capacitor.	81.2975	84.38	86.8274	-32.55	80.1937	-153.99	0	0	9.13629	-6.18	81.2975	-95.62	86.8274	147.45	80.1937	26.01	0	0	9.13629	17
15	Capacitor.	40.0721	-154.25	0	0	0	0	0	0	40.0721	-154.25	40.0721	25.75	0	0	0	0	0	0	40.0721	2
16	Transform	17.9736	-0.89	19.7435	-108.64	22.2829	121.56	0	0	3.73E-09	-90	594.228	151.31	434.699	38.71	625.014	-86.6	159.66	24.74	1.20E-07	2
17	Transform	81.884	-37.78	61.9255	-159.13	63.5645	80.41	19.8852	151.31	1.12E-06	-175.57	709.661	142.22	536.687	20.87	550.892	-99.59	172.339	-28.69	1.08E-05	17
18	Transform	594.228	-28.69	594.228	151.31	0	0	0	0	0.000347	-90	562.582	151.31	562.582	-28.69	0	0	0	0	0.000367	
19	Transform	434.699	-141.29	434.699	38.71	0	0	0	0	0.000347	150	418.987	38.71	418.987	-141.29	0	0	0	0	0.000361	
20	Transform	625.014	93.4	625.014	-86.6	0	0	0	0	0.000347	30	591.729	-86.6	591.729	93.4	0	0	0	0	0.000367	
21	Line.6716	230.948	-18.43	68.5035	-55.9	180.309	108.74	0	0	203.751	11.61	230.948	161.57	68.5035	124.1	180.309	-71.26	0	0	203.751	-16
22	Load.671	185.361	-33.65	185.359	-153.62	185.447	86.37	0	0	2.13E-14	0	0	0	0	0	0	0	0	0	0	
23	Load.634A	709.645	-37.78	709.645	142.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	


IEEE13BARRAS_EXP_SEQCURRENTS - Excel
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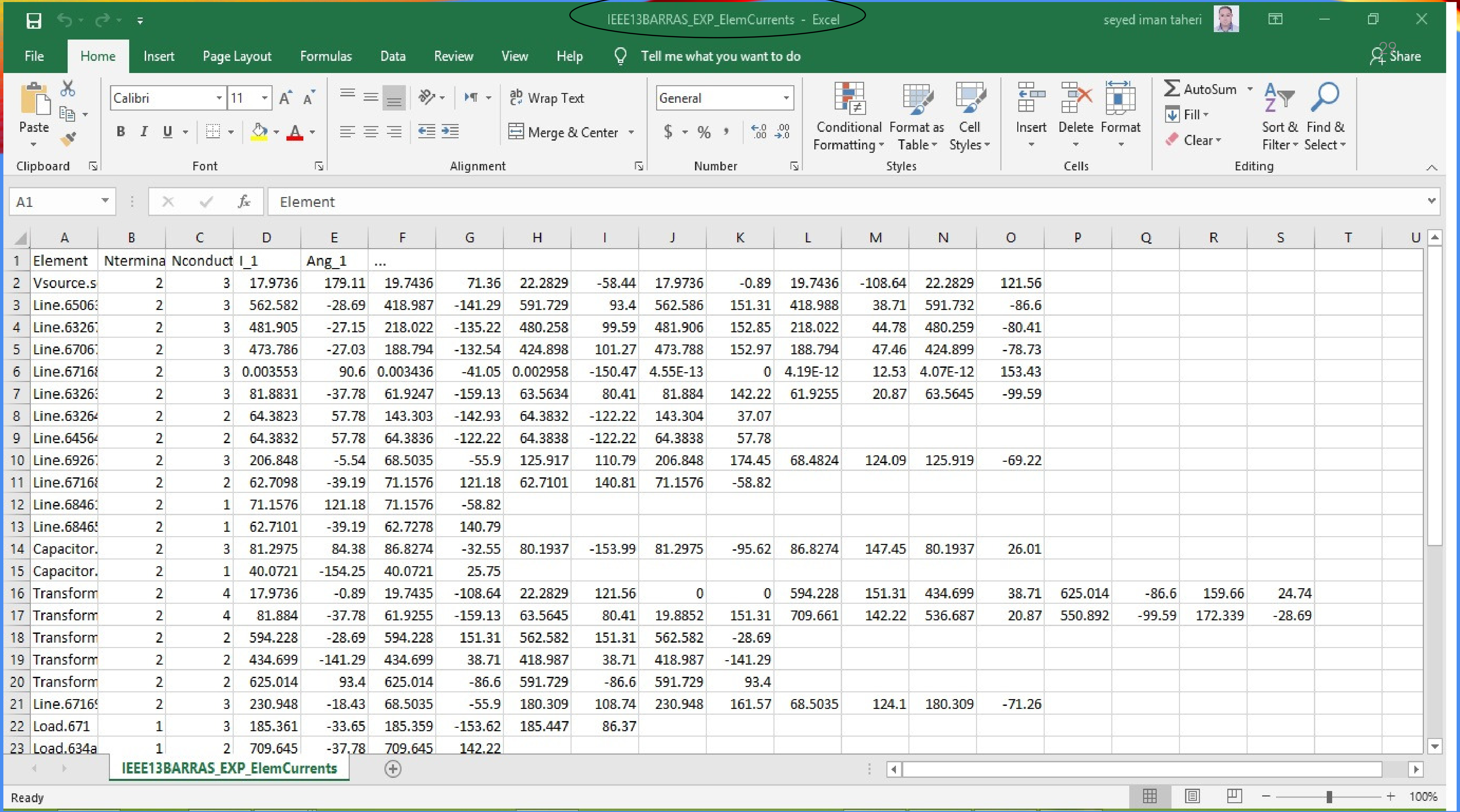
File
Home
Insert
Page Layout
Formulas
Data
Review
View
Help
Tell me what you want to do
Share
Paste
Clipboard
Calibri
11
Font
Wrap Text
Merge & Center
Alignment
General
Number
Conditional Formatting
Format as Table
Cell Styles
Styles
Insert
Delete
Format
Cells
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Editing
A1
Element
IEEE13BARRAS_EXP_SEQCURRENTS
Ready
100%

Element	Terminal	I1	%Normal	%Emerge	I2	%I2/I1	I0	%I0/I1	Iresidual	%NEMA
Vsource.S	1	19.9172	0	0	2.53647	12.74	1.78E-07	8.92E-07	5.33E-07	11.41
Vsource.S	2	19.9172	0	0	2.53647	12.74	1.78E-07	8.92E-07	5.33E-07	11.41
Line.6506	1	523.744	130.9	87.29	64.1873	12.26	47.9836	9.162	143.951	20.11
Line.6506	2	523.747	0	0	64.1879	12.26	47.9837	9.162	143.951	20.11
Line.6326	1	392.178	98.04	65.36	105.059	26.79	72.7778	18.56	218.333	44.58
Line.6326	2	392.179	0	0	105.059	26.79	72.7779	18.56	218.333	44.58
Line.6706	1	360.826	90.21	60.14	106.283	29.46	73.4406	20.35	220.322	47.92
Line.6706	2	360.827	0	0	106.283	29.46	73.4407	20.35	220.322	47.92
Line.6716	1	0.003301	0.000825	0.00055	0.000397	12.04	5.42E-05	1.641	0.000163	10.78
Line.6716	2	1.81E-12	0	0	2.69E-12	148.9	9.59E-13	53	0.000163	84.35
Line.6326	1	69.1171	17.28	11.52	6.23152	9.016	6.62845	9.59	19.8853	18.46
Line.6326	2	69.118	0	0	6.23152	9.016	6.62841	9.59	19.8853	18.46
Line.6326	1	0	0	0	0	0	0	0	86.1464	0
Line.6326	2	0	0	0	0	0	0	0	86.1464	0
Line.6456	1	0	0	0	0	0	0	0	0.000521	0
Line.6456	2	0	0	0	0	0	0	0	0.000521	0
Line.6926	1	120.247	30.06	20.04	45.1576	37.55	67.9169	56.48	203.751	54.65
Line.6926	2	120.244	0	0	45.1574	37.55	67.9161	56.48	203.751	54.65
Line.6716	1	0	0	0	0	0	0	0	24.29	0
Line.6716	2	0	0	0	0	0	0	0	24.29	0
Line.6846	1	0	0	0	0	0	0	0	71.1576	0
Line.6846	2	0	0	0	0	0	0	0	71.1576	0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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Element	Ntermina	Nconduct	I_1	Ang_1	...													
2	Vsource.s	2	3	17.9736	179.11	19.7436	71.36	22.2829	-58.44	17.9736	-0.89	19.7436	-108.64	22.2829	121.56				
3	Line.6506	2	3	562.582	-28.69	418.987	-141.29	591.729	93.4	562.586	151.31	418.988	38.71	591.732	-86.6				
4	Line.6326	2	3	481.905	-27.15	218.022	-135.22	480.258	99.59	481.906	152.85	218.022	44.78	480.259	-80.41				
5	Line.6706	2	3	473.786	-27.03	188.794	-132.54	424.898	101.27	473.788	152.97	188.794	47.46	424.899	-78.73				
6	Line.6716	2	3	0.003553	90.6	0.003436	-41.05	0.002958	-150.47	4.55E-13	0	4.19E-12	12.53	4.07E-12	153.43				
7	Line.6326	2	3	81.8831	-37.78	61.9247	-159.13	63.5634	80.41	81.884	142.22	61.9255	20.87	63.5645	-99.59				
8	Line.6326	2	2	64.3823	57.78	143.303	-142.93	64.3832	-122.22	143.304	37.07								
9	Line.6456	2	2	64.3832	57.78	64.3836	-122.22	64.3838	-122.22	64.3838	57.78								
10	Line.6926	2	3	206.848	-5.54	68.5035	-55.9	125.917	110.79	206.848	174.45	68.4824	124.09	125.919	-69.22				
11	Line.6716	2	2	62.7098	-39.19	71.1576	121.18	62.7101	140.81	71.1576	-58.82								
12	Line.6846	2	1	71.1576	121.18	71.1576	-58.82												
13	Line.6846	2	1	62.7101	-39.19	62.7278	140.79												
14	Capacitor.	2	3	81.2975	84.38	86.8274	-32.55	80.1937	-153.99	81.2975	-95.62	86.8274	147.45	80.1937	26.01				
15	Capacitor.	2	1	40.0721	-154.25	40.0721	25.75												
16	Transform	2	4	17.9736	-0.89	19.7435	-108.64	22.2829	121.56	0	0	594.228	151.31	434.699	38.71	625.014	-86.6	159.66	24.74
17	Transform	2	4	81.884	-37.78	61.9255	-159.13	63.5645	80.41	19.8852	151.31	709.661	142.22	536.687	20.87	550.892	-99.59	172.339	-28.69
18	Transform	2	2	594.228	-28.69	594.228	151.31	562.582	151.31	562.582	-28.69								
19	Transform	2	2	434.699	-141.29	434.699	38.71	418.987	38.71	418.987	-141.29								
20	Transform	2	2	625.014	93.4	625.014	-86.6	591.729	-86.6	591.729	93.4								
21	Line.6716	2	3	230.948	-18.43	68.5035	-55.9	180.309	108.74	230.948	161.57	68.5035	124.1	180.309	-71.26				
22	Load.671	1	3	185.361	-33.65	185.359	-153.62	185.447	86.37										
23	Load.634a	1	2	709.645	-37.78	709.645	142.22												

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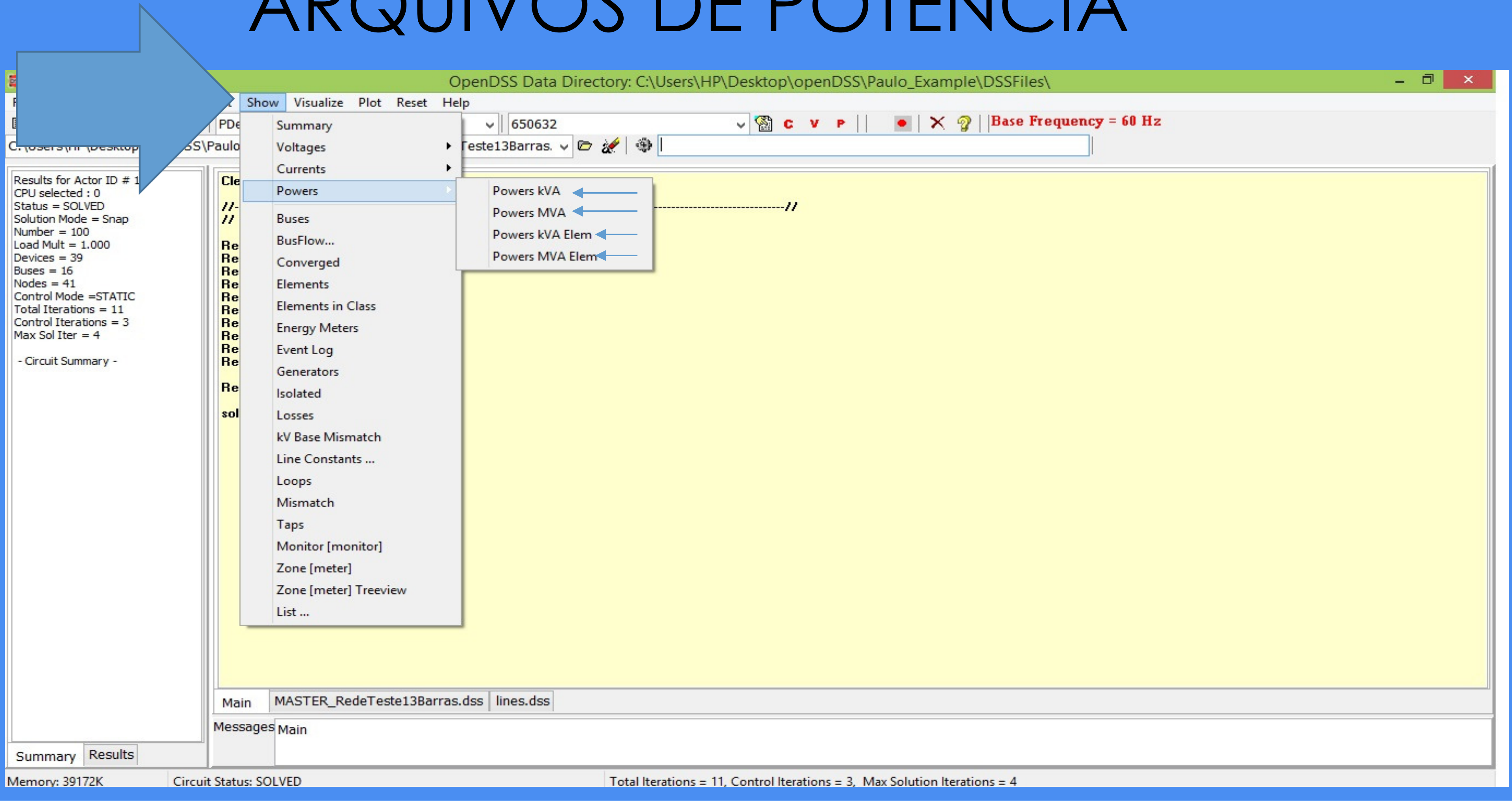
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650632
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Summary
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Currents
Powers
Buses
BusFlow...
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Elements
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Energy Meters
Event Log
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Powers MVA
Powers kVA Elem
Powers MVA Elem
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MASTER_RedeTeste13Barras.dss
lines.dss
Messages
Main
Summary
Results

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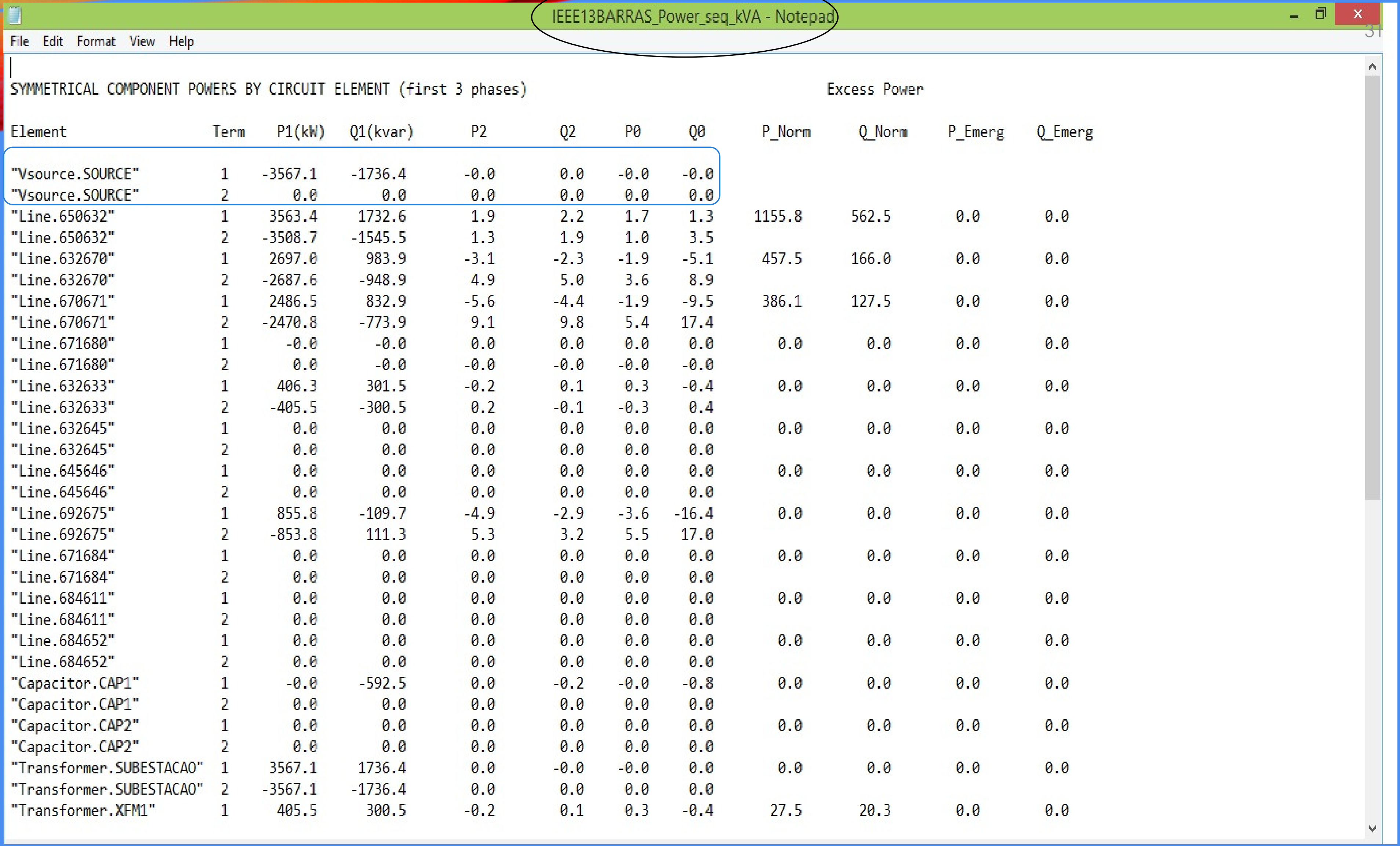
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Memory: 39172K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```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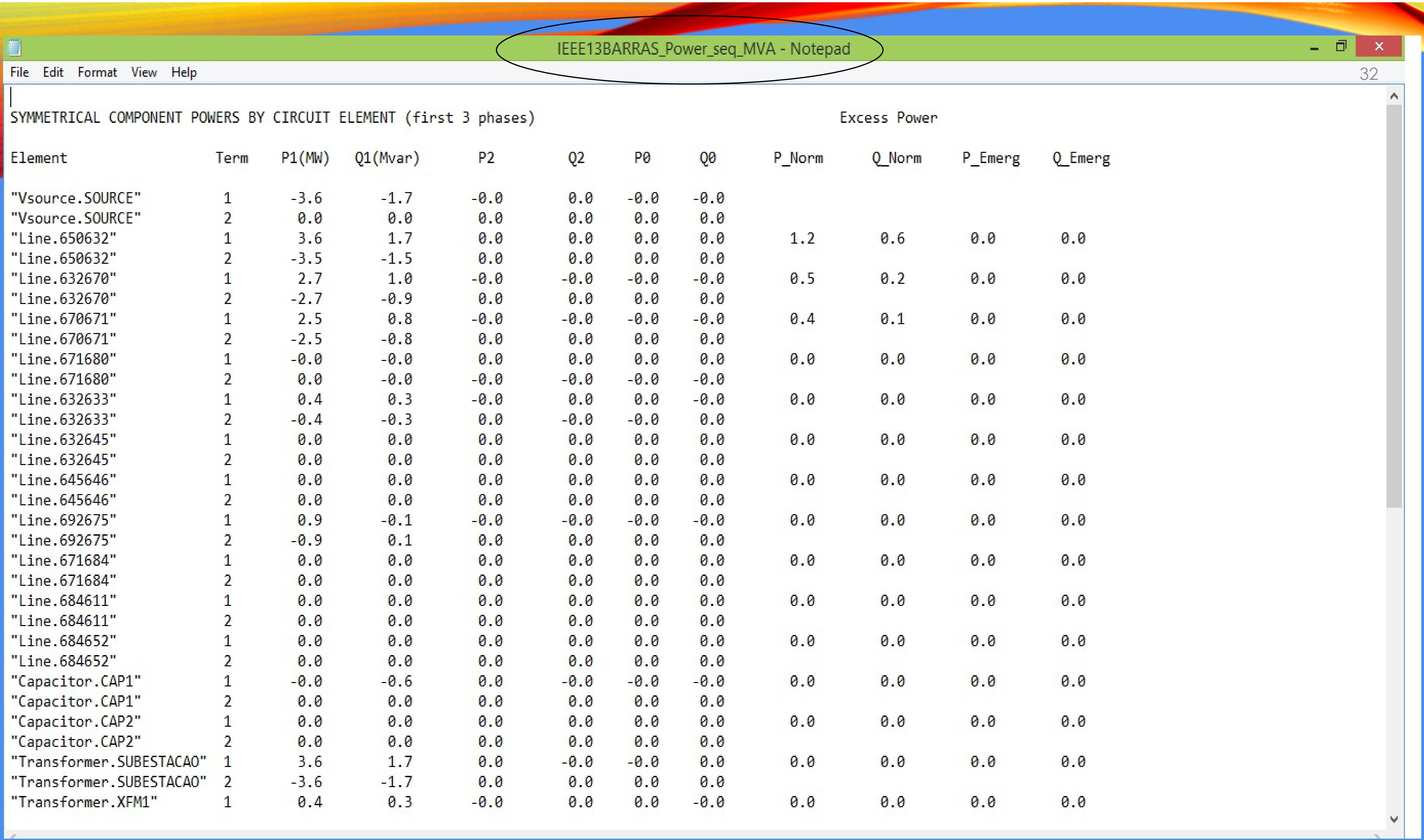
```
SYMMETRICAL COMPONENT POWERS BY CIRCUIT ELEMENT (first 3 phases)                          Excess Power

Element                    Term   P1(kW)   Q1(kvar)       P2          Q2       P0       Q0      P_Norm      Q_Norm      P_Emerg     Q_Emerg

"Vsource.SOURCE"             1   -3567.1    -1736.4      -0.0         0.0     -0.0     -0.0
"Vsource.SOURCE"             2       0.0        0.0       0.0         0.0      0.0      0.0
"Line.650632"                1    3563.4     1732.6       1.9         2.2      1.7      1.3     1155.8       562.5        0.0         0.0
"Line.650632"                2   -3508.7    -1545.5       1.3         1.9      1.0      3.5
"Line.632670"                1    2697.0      983.9      -3.1        -2.3     -1.9     -5.1      457.5       166.0        0.0         0.0
"Line.632670"                2   -2687.6     -948.9       4.9         5.0      3.6      8.9
"Line.670671"                1    2486.5      832.9      -5.6        -4.4     -1.9     -9.5      386.1       127.5        0.0         0.0
"Line.670671"                2   -2470.8     -773.9       9.1         9.8      5.4     17.4
"Line.671680"                1      -0.0       -0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.671680"                2       0.0       -0.0      -0.0        -0.0     -0.0     -0.0
"Line.632633"                1     406.3      301.5      -0.2         0.1      0.3     -0.4        0.0         0.0        0.0         0.0
"Line.632633"                2    -405.5     -300.5       0.2        -0.1     -0.3      0.4
"Line.632645"                1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.632645"                2       0.0        0.0       0.0         0.0      0.0      0.0
"Line.645646"                1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.645646"                2       0.0        0.0       0.0         0.0      0.0      0.0
"Line.692675"                1     855.8     -109.7      -4.9        -2.9     -3.6    -16.4        0.0         0.0        0.0         0.0
"Line.692675"                2    -853.8      111.3       5.3         3.2      5.5     17.0
"Line.671684"                1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.671684"                2       0.0        0.0       0.0         0.0      0.0      0.0
"Line.684611"                1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.684611"                2       0.0        0.0       0.0         0.0      0.0      0.0
"Line.684652"                1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Line.684652"                2       0.0        0.0       0.0         0.0      0.0      0.0
"Capacitor.CAP1"             1      -0.0     -592.5       0.0        -0.2     -0.0     -0.8        0.0         0.0        0.0         0.0
"Capacitor.CAP1"             2       0.0        0.0       0.0         0.0      0.0      0.0
"Capacitor.CAP2"             1       0.0        0.0       0.0         0.0      0.0      0.0        0.0         0.0        0.0         0.0
"Capacitor.CAP2"             2       0.0        0.0       0.0         0.0      0.0      0.0
"Transformer.SUBESTACAO"     1    3567.1     1736.4       0.0        -0.0     -0.0      0.0        0.0         0.0        0.0         0.0
"Transformer.SUBESTACAO"     2   -3567.1    -1736.4       0.0         0.0      0.0      0.0
"Transformer.XFM1"           1     405.5      300.5      -0.2         0.1      0.3     -0.4       27.5        20.3        0.0         0.0
```



```
SYMMETRICAL COMPONENT POWERS BY CIRCUIT ELEMENT (first 3 phases)                                     Excess Power

Element                   Term    P1(MW)   Q1(Mvar)       P2         Q2       P0       Q0         P_Norm       Q_Norm      P_Emerg     Q_Emerg

"Vsource.SOURCE"           1       -3.6       -1.7       -0.0        0.0     -0.0     -0.0
"Vsource.SOURCE"           2        0.0        0.0        0.0        0.0      0.0      0.0
"Line.650632"              1        3.6        1.7        0.0        0.0      0.0      0.0         1.2          0.6         0.0         0.0
"Line.650632"              2       -3.5       -1.5        0.0        0.0      0.0      0.0
"Line.632670"              1        2.7        1.0       -0.0       -0.0     -0.0     -0.0         0.5          0.2         0.0         0.0
"Line.632670"              2       -2.7       -0.9        0.0        0.0      0.0      0.0
"Line.670671"              1        2.5        0.8       -0.0       -0.0     -0.0     -0.0         0.4          0.1         0.0         0.0
"Line.670671"              2       -2.5       -0.8        0.0        0.0      0.0      0.0
"Line.671680"              1       -0.0       -0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.671680"              2        0.0       -0.0       -0.0       -0.0     -0.0     -0.0
"Line.632633"              1        0.4        0.3       -0.0        0.0      0.0     -0.0         0.0          0.0         0.0         0.0
"Line.632633"              2       -0.4       -0.3        0.0       -0.0     -0.0      0.0
"Line.632645"              1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.632645"              2        0.0        0.0        0.0        0.0      0.0      0.0
"Line.645646"              1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.645646"              2        0.0        0.0        0.0        0.0      0.0      0.0
"Line.692675"              1        0.9       -0.1       -0.0       -0.0     -0.0     -0.0         0.0          0.0         0.0         0.0
"Line.692675"              2       -0.9        0.1        0.0        0.0      0.0      0.0
"Line.671684"              1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.671684"              2        0.0        0.0        0.0        0.0      0.0      0.0
"Line.684611"              1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.684611"              2        0.0        0.0        0.0        0.0      0.0      0.0
"Line.684652"              1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Line.684652"              2        0.0        0.0        0.0        0.0      0.0      0.0
"Capacitor.CAP1"           1       -0.0       -0.6        0.0       -0.0     -0.0     -0.0         0.0          0.0         0.0         0.0
"Capacitor.CAP1"           2        0.0        0.0        0.0        0.0      0.0      0.0
"Capacitor.CAP2"           1        0.0        0.0        0.0        0.0      0.0      0.0         0.0          0.0         0.0         0.0
"Capacitor.CAP2"           2        0.0        0.0        0.0        0.0      0.0      0.0
"Transformer.SUBESTACAO"   1        3.6        1.7        0.0       -0.0     -0.0      0.0         0.0          0.0         0.0         0.0
"Transformer.SUBESTACAO"   2       -3.6       -1.7        0.0        0.0      0.0      0.0
"Transformer.XFM1"         1        0.4        0.3       -0.0        0.0      0.0     -0.0         0.0          0.0         0.0         0.0
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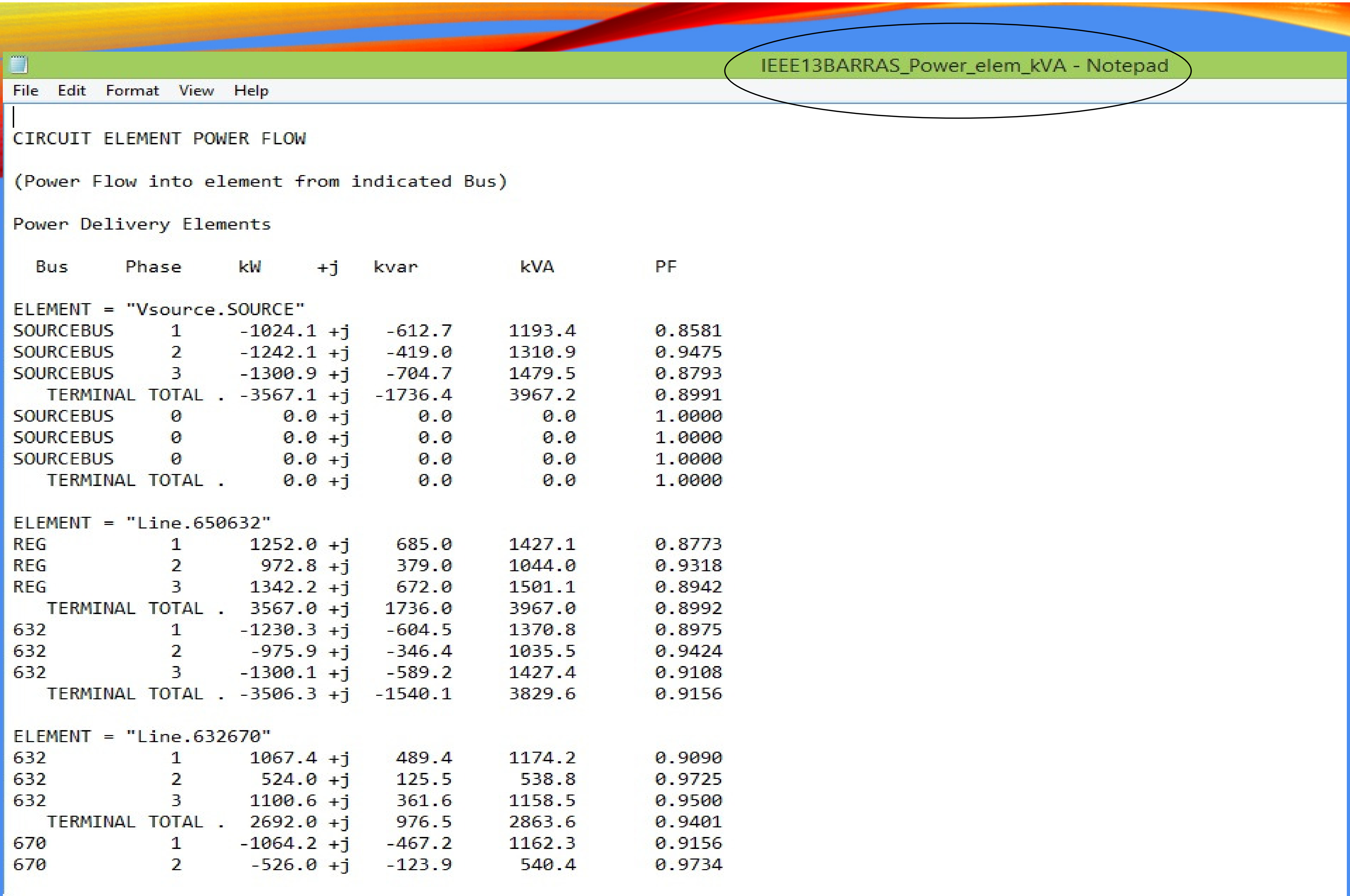


```
CIRCUIT ELEMENT POWER FLOW

(Power Flow into element from indicated Bus)

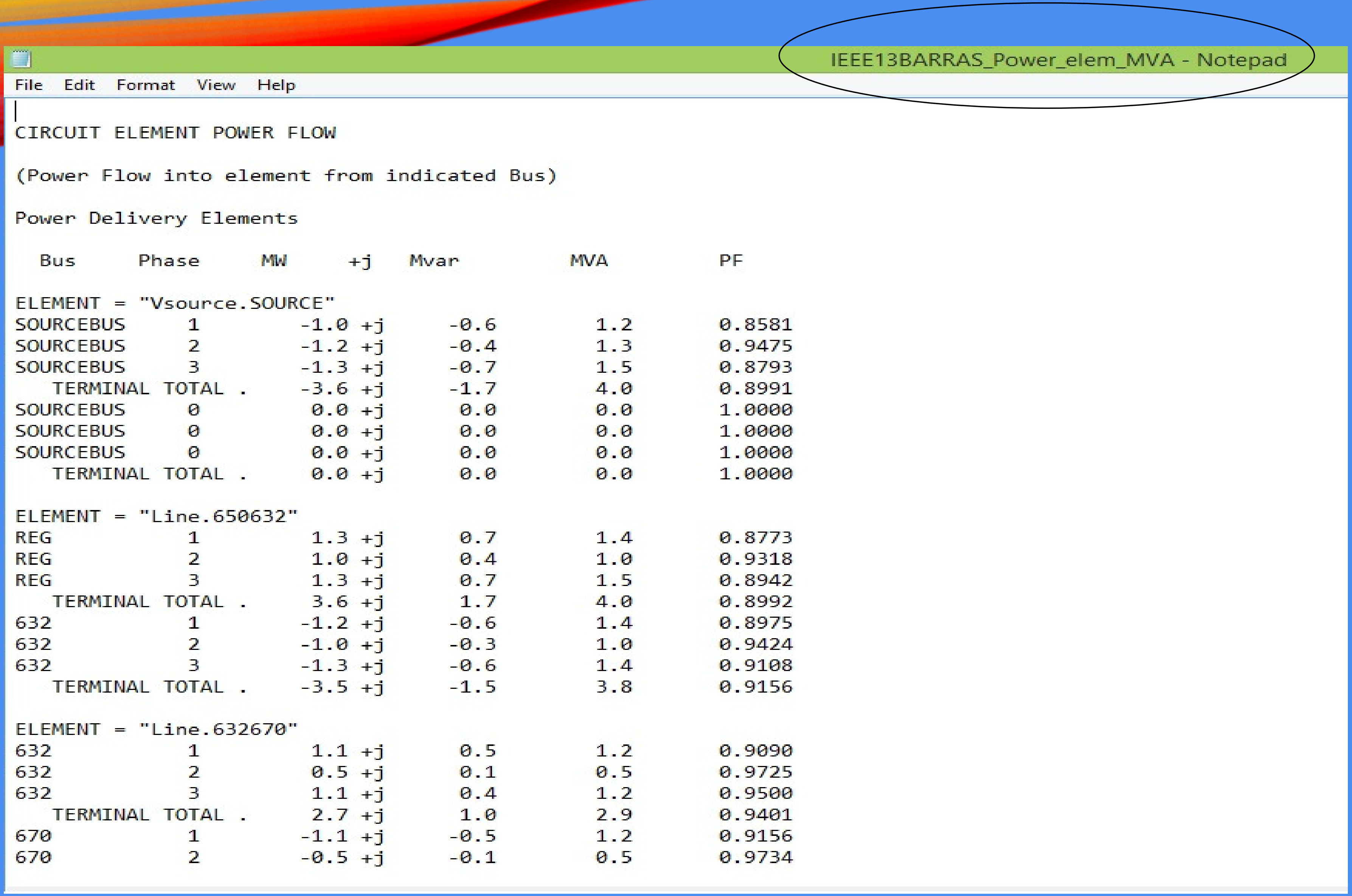
Power Delivery Elements

  Bus      Phase     kW     +j   kvar         kVA         PF

ELEMENT = "Vsource.SOURCE"
SOURCEBUS      1      -1024.1 +j   -612.7     1193.4       0.8581
SOURCEBUS      2      -1242.1 +j   -419.0     1310.9       0.9475
SOURCEBUS      3      -1300.9 +j   -704.7     1479.5       0.8793
   TERMINAL TOTAL . -3567.1 +j  -1736.4     3967.2       0.8991
SOURCEBUS      0          0.0 +j      0.0        0.0       1.0000
SOURCEBUS      0          0.0 +j      0.0        0.0       1.0000
SOURCEBUS      0          0.0 +j      0.0        0.0       1.0000
   TERMINAL TOTAL .      0.0 +j      0.0        0.0       1.0000

ELEMENT = "Line.650632"
REG            1       1252.0 +j    685.0     1427.1       0.8773
REG            2        972.8 +j    379.0     1044.0       0.9318
REG            3       1342.2 +j    672.0     1501.1       0.8942
   TERMINAL TOTAL .  3567.0 +j   1736.0     3967.0       0.8992
632            1      -1230.3 +j   -604.5     1370.8       0.8975
632            2       -975.9 +j   -346.4     1035.5       0.9424
632            3      -1300.1 +j   -589.2     1427.4       0.9108
   TERMINAL TOTAL . -3506.3 +j  -1540.1     3829.6       0.9156

ELEMENT = "Line.632670"
632            1       1067.4 +j    489.4     1174.2       0.9090
632            2        524.0 +j    125.5      538.8       0.9725
632            3       1100.6 +j    361.6     1158.5       0.9500
   TERMINAL TOTAL .  2692.0 +j    976.5     2863.6       0.9401
670            1      -1064.2 +j   -467.2     1162.3       0.9156
670            2       -526.0 +j   -123.9      540.4       0.9734
```



```
CIRCUIT ELEMENT POWER FLOW

(Power Flow into element from indicated Bus)

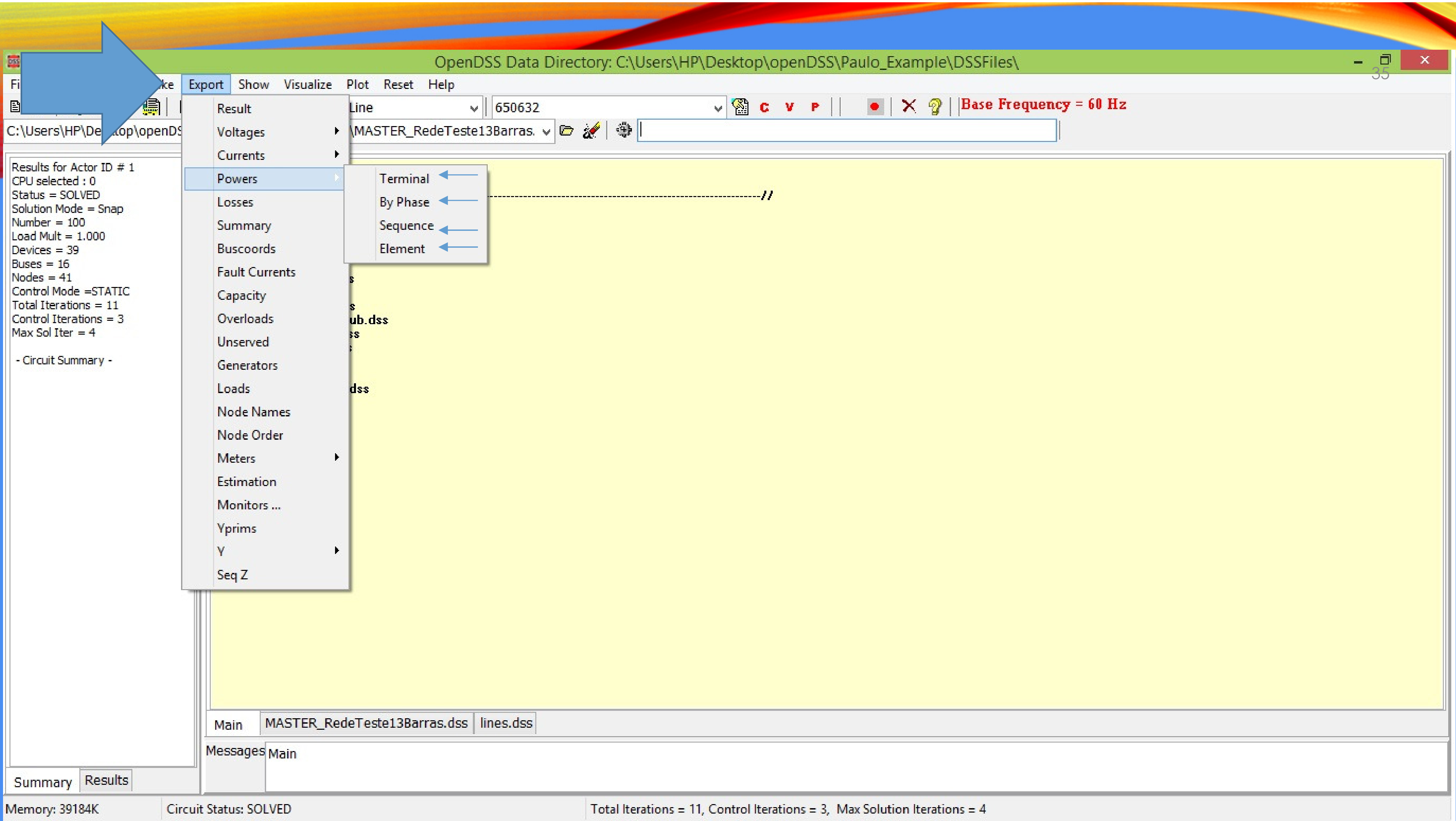
Power Delivery Elements

  Bus       Phase      MW      +j   Mvar           MVA          PF

ELEMENT = "Vsource.SOURCE"
SOURCEBUS      1         -1.0 +j      -0.6         1.2        0.8581
SOURCEBUS      2         -1.2 +j      -0.4         1.3        0.9475
SOURCEBUS      3         -1.3 +j      -0.7         1.5        0.8793
   TERMINAL TOTAL .      -3.6 +j      -1.7         4.0        0.8991
SOURCEBUS      0          0.0 +j       0.0         0.0        1.0000
SOURCEBUS      0          0.0 +j       0.0         0.0        1.0000
SOURCEBUS      0          0.0 +j       0.0         0.0        1.0000
   TERMINAL TOTAL .       0.0 +j       0.0         0.0        1.0000

ELEMENT = "Line.650632"
REG            1          1.3 +j       0.7         1.4        0.8773
REG            2          1.0 +j       0.4         1.0        0.9318
REG            3          1.3 +j       0.7         1.5        0.8942
   TERMINAL TOTAL .       3.6 +j       1.7         4.0        0.8992
632            1         -1.2 +j      -0.6         1.4        0.8975
632            2         -1.0 +j      -0.3         1.0        0.9424
632            3         -1.3 +j      -0.6         1.4        0.9108
   TERMINAL TOTAL .      -3.5 +j      -1.5         3.8        0.9156

ELEMENT = "Line.632670"
632            1          1.1 +j       0.5         1.2        0.9090
632            2          0.5 +j       0.1         0.5        0.9725
632            3          1.1 +j       0.4         1.2        0.9500
   TERMINAL TOTAL .       2.7 +j       1.0         2.9        0.9401
670            1         -1.1 +j      -0.5         1.2        0.9156
670            2         -0.5 +j      -0.1         0.5        0.9734
```



OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\

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Results for Actor ID # 1
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Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Memory: 39184K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
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Result
Voltages
Currents
Powers
Losses
Summary
Buscoords
Fault Currents
Capacity
Overloads
Unserved
Generators
Loads
Node Names
Node Order
Meters
Estimation
Monitors ...
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Y
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Element
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MASTER_RedeTeste13Barras.dss
lines.dss
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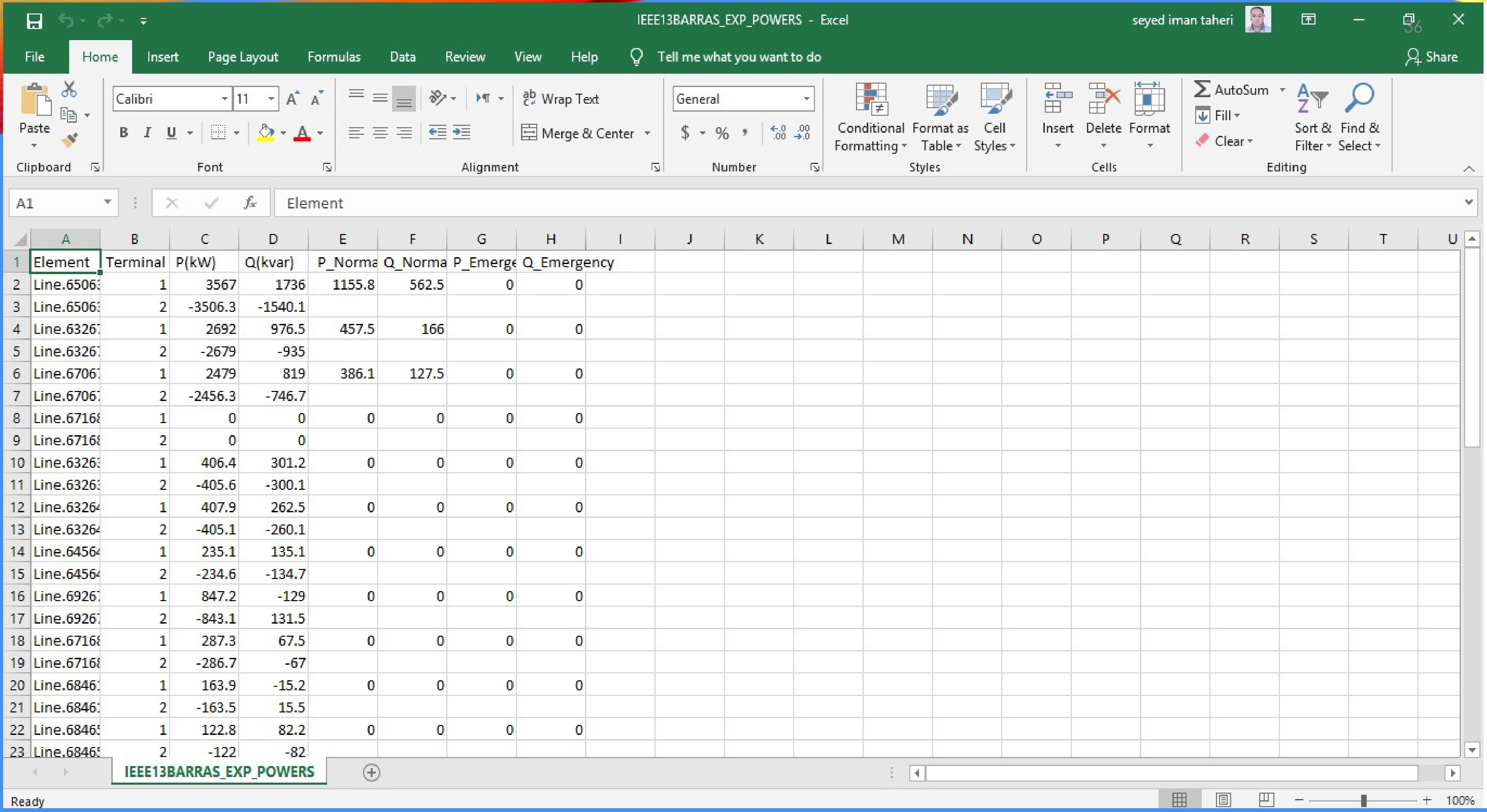
Main
Summary
Results


IEEE13BARRAS_EXP_POWERS - Excel
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A1
Element
IEEE13BARRAS_EXP_POWERS
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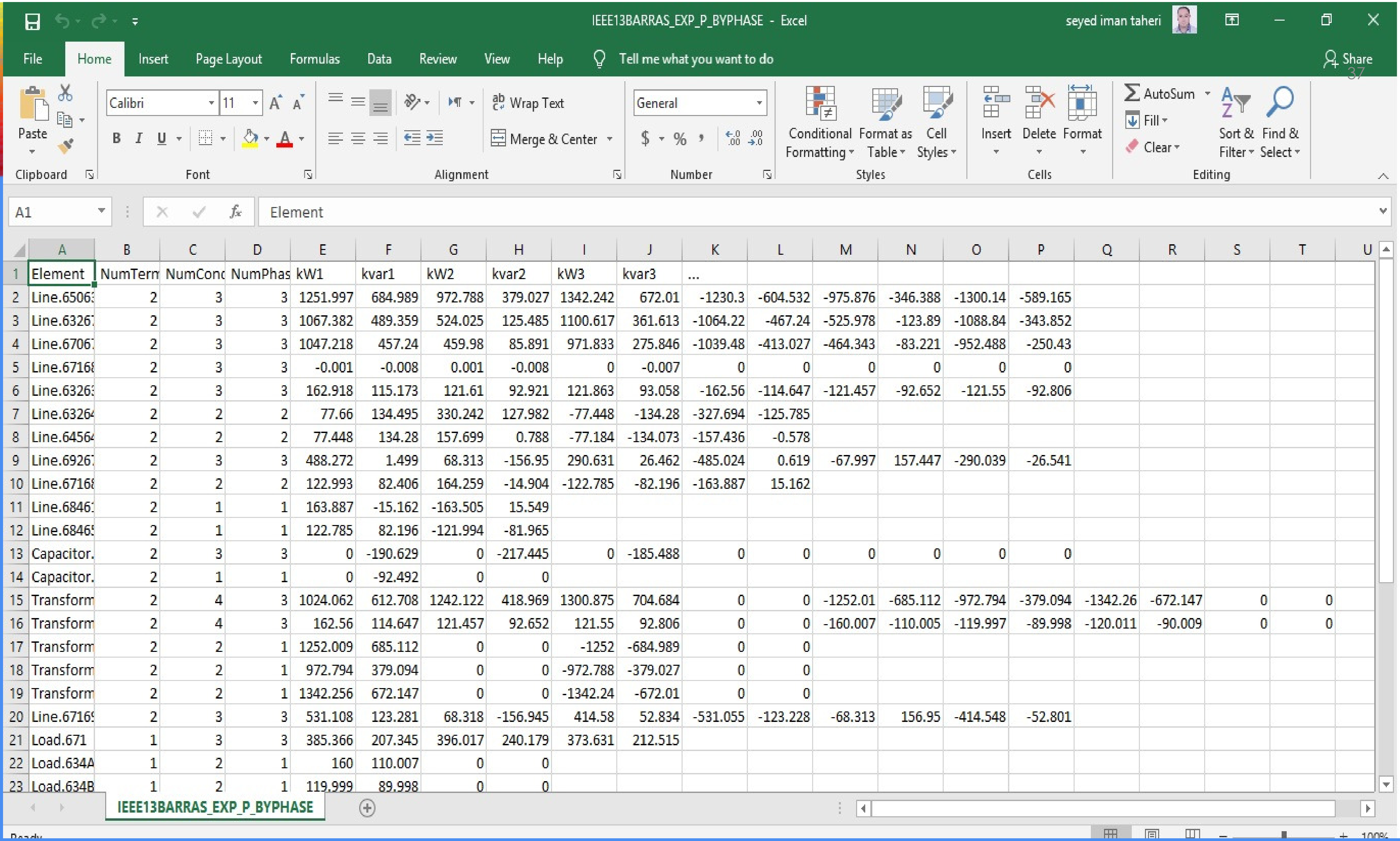
Element	Terminal	P(kW)	Q(kvar)	P_Norma	Q_Norma	P_Emerge	Q_Emergency
Line.6506	1	3567	1736	1155.8	562.5	0	0
Line.6506	2	-3506.3	-1540.1				
Line.6326	1	2692	976.5	457.5	166	0	0
Line.6326	2	-2679	-935				
Line.6706	1	2479	819	386.1	127.5	0	0
Line.6706	2	-2456.3	-746.7				
Line.6716	1	0	0	0	0	0	0
Line.6716	2	0	0				
Line.6326	1	406.4	301.2	0	0	0	0
Line.6326	2	-405.6	-300.1				
Line.6326	1	407.9	262.5	0	0	0	0
Line.6326	2	-405.1	-260.1				
Line.6456	1	235.1	135.1	0	0	0	0
Line.6456	2	-234.6	-134.7				
Line.6926	1	847.2	-129	0	0	0	0
Line.6926	2	-843.1	131.5				
Line.6716	1	287.3	67.5	0	0	0	0
Line.6716	2	-286.7	-67				
Line.6846	1	163.9	-15.2	0	0	0	0
Line.6846	2	-163.5	15.5				
Line.6846	1	122.8	82.2	0	0	0	0
Line.6846	2	-122	-82				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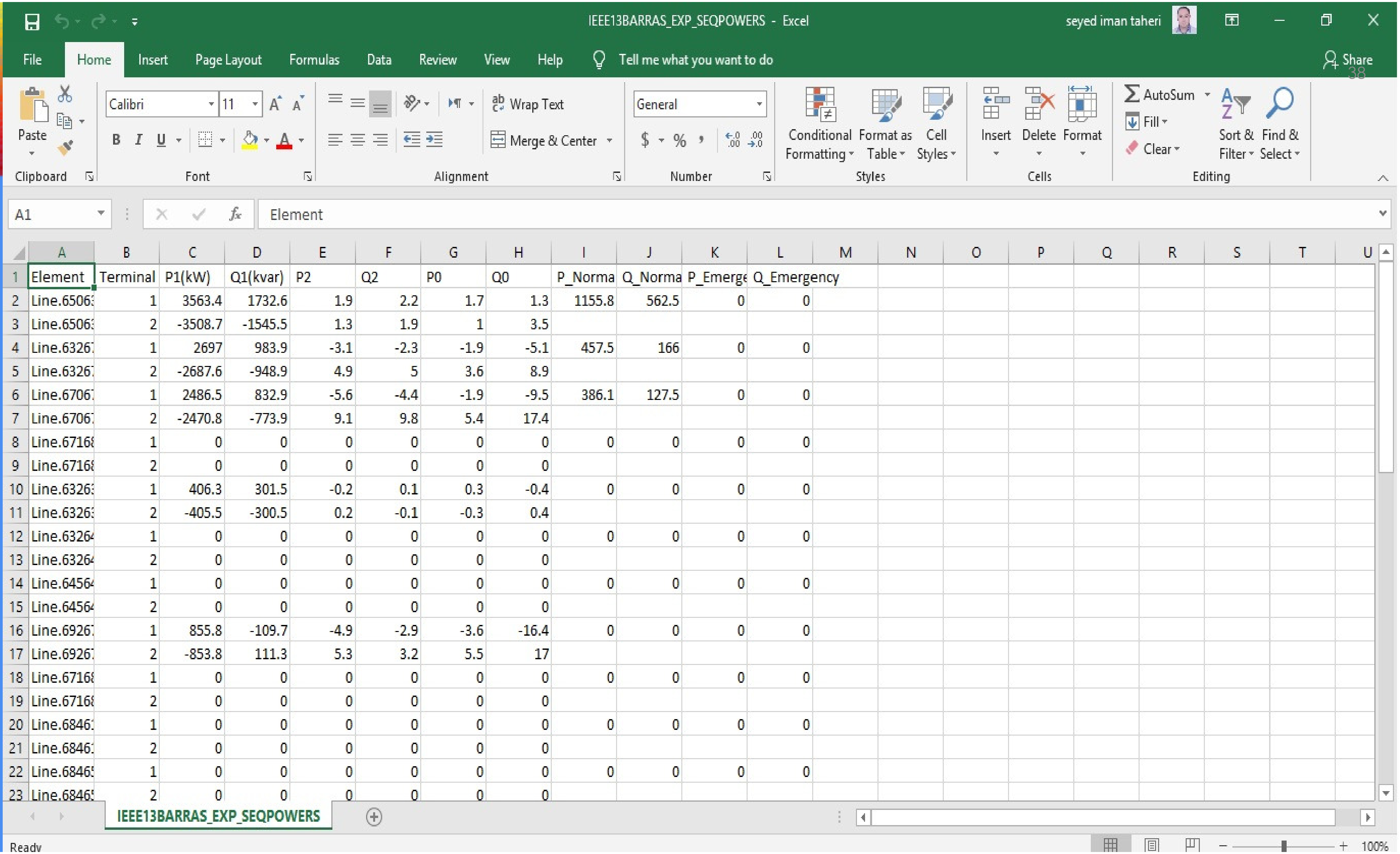
IEEE13BARRAS_EXP_P_BYPHASE

A1 Element

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Element	NumTerm	NumCond	NumPhas	kW1	kvar1	kW2	kvar2	kW3	kvar3	...									
2	Line.6506	2	3	3	1251.997	684.989	972.788	379.027	1342.242	672.01	-1230.3	-604.532	-975.876	-346.388	-1300.14	-589.165				
3	Line.6326	2	3	3	1067.382	489.359	524.025	125.485	1100.617	361.613	-1064.22	-467.24	-525.978	-123.89	-1088.84	-343.852				
4	Line.6706	2	3	3	1047.218	457.24	459.98	85.891	971.833	275.846	-1039.48	-413.027	-464.343	-83.221	-952.488	-250.43				
5	Line.6716	2	3	3	-0.001	-0.008	0.001	-0.008	0	-0.007	0	0	0	0	0	0				
6	Line.6326	2	3	3	162.918	115.173	121.61	92.921	121.863	93.058	-162.56	-114.647	-121.457	-92.652	-121.55	-92.806				
7	Line.6326	2	2	2	77.66	134.495	330.242	127.982	-77.448	-134.28	-327.694	-125.785								
8	Line.6456	2	2	2	77.448	134.28	157.699	0.788	-77.184	-134.073	-157.436	-0.578								
9	Line.6926	2	3	3	488.272	1.499	68.313	-156.95	290.631	26.462	-485.024	0.619	-67.997	157.447	-290.039	-26.541				
10	Line.6716	2	2	2	122.993	82.406	164.259	-14.904	-122.785	-82.196	-163.887	15.162								
11	Line.6846	2	1	1	163.887	-15.162	-163.505	15.549												
12	Line.6846	2	1	1	122.785	82.196	-121.994	-81.965												
13	Capacitor.	2	3	3	0	-190.629	0	-217.445	0	-185.488	0	0	0	0	0	0				
14	Capacitor.	2	1	1	0	-92.492	0	0												
15	Transform	2	4	3	1024.062	612.708	1242.122	418.969	1300.875	704.684	0	0	-1252.01	-685.112	-972.794	-379.094	-1342.26	-672.147	0	0
16	Transform	2	4	3	162.56	114.647	121.457	92.652	121.55	92.806	0	0	-160.007	-110.005	-119.997	-89.998	-120.011	-90.009	0	0
17	Transform	2	2	1	1252.009	685.112	0	0	-1252	-684.989	0	0								
18	Transform	2	2	1	972.794	379.094	0	0	-972.788	-379.027	0	0								
19	Transform	2	2	1	1342.256	672.147	0	0	-1342.24	-672.01	0	0								
20	Line.6716	2	3	3	531.108	123.281	68.318	-156.945	414.58	52.834	-531.055	-123.228	-68.313	156.95	-414.548	-52.801				
21	Load.671	1	3	3	385.366	207.345	396.017	240.179	373.631	212.515										
22	Load.634A	1	2	1	160	110.007	0	0												
23	Load.634B	1	2	1	119.999	89.998	0	0												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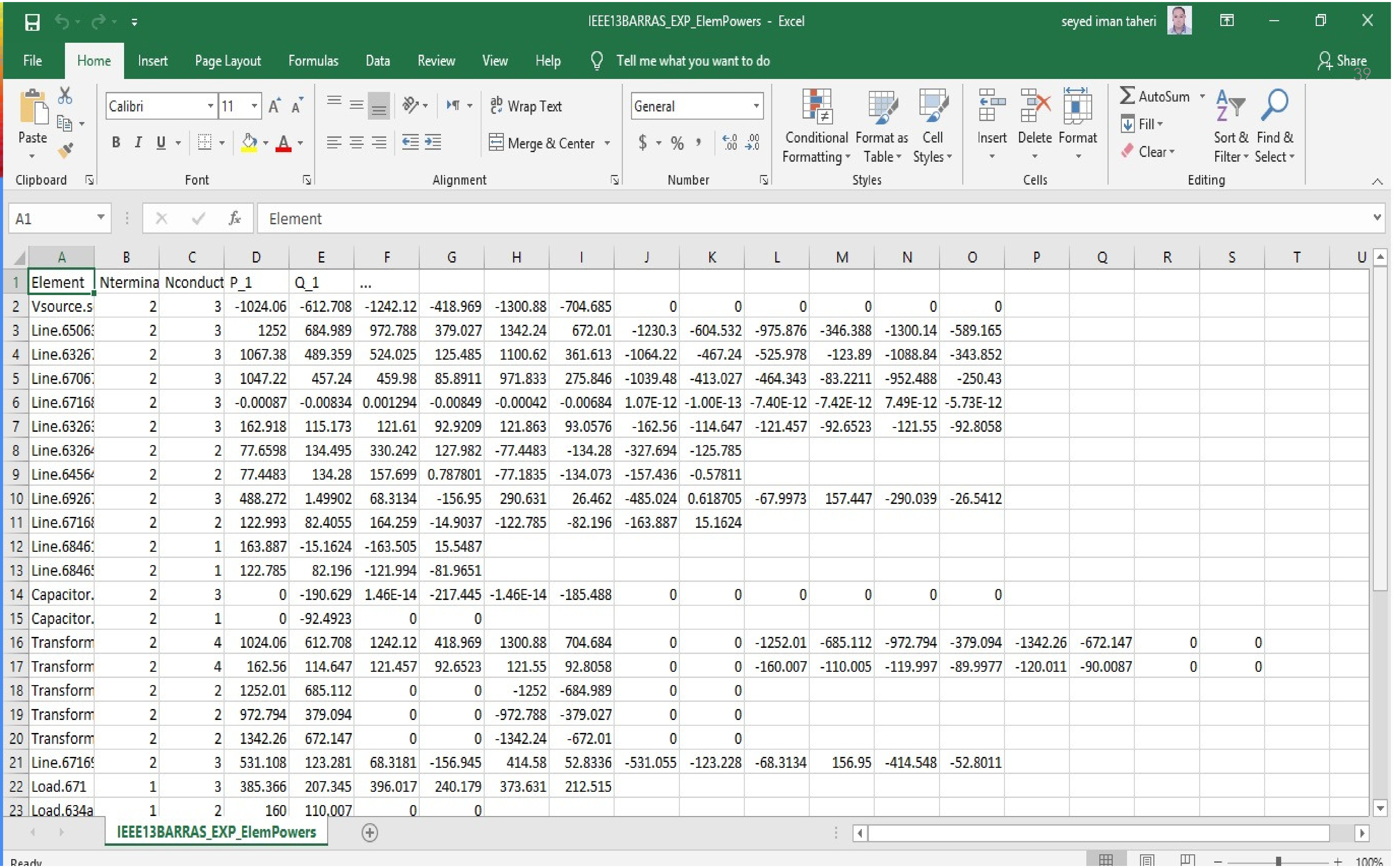
Element	Terminal	P1(kW)	Q1(kvar)	P2	Q2	P0	Q0	P_Norma	Q_Norma	P_Emerge	Q_Emergency
Line.6506	1	3563.4	1732.6	1.9	2.2	1.7	1.3	1155.8	562.5	0	0
Line.6506	2	-3508.7	-1545.5	1.3	1.9	1	3.5				
Line.6326	1	2697	983.9	-3.1	-2.3	-1.9	-5.1	457.5	166	0	0
Line.6326	2	-2687.6	-948.9	4.9	5	3.6	8.9				
Line.6706	1	2486.5	832.9	-5.6	-4.4	-1.9	-9.5	386.1	127.5	0	0
Line.6706	2	-2470.8	-773.9	9.1	9.8	5.4	17.4				
Line.6716	1	0	0	0	0	0	0	0	0	0	0
Line.6716	2	0	0	0	0	0	0				
Line.6326	1	406.3	301.5	-0.2	0.1	0.3	-0.4	0	0	0	0
Line.6326	2	-405.5	-300.5	0.2	-0.1	-0.3	0.4				
Line.6326	1	0	0	0	0	0	0	0	0	0	0
Line.6326	2	0	0	0	0	0	0				
Line.6456	1	0	0	0	0	0	0	0	0	0	0
Line.6456	2	0	0	0	0	0	0				
Line.6926	1	855.8	-109.7	-4.9	-2.9	-3.6	-16.4	0	0	0	0
Line.6926	2	-853.8	111.3	5.3	3.2	5.5	17				
Line.6716	1	0	0	0	0	0	0	0	0	0	0
Line.6716	2	0	0	0	0	0	0				
Line.6846	1	0	0	0	0	0	0	0	0	0	0
Line.6846	2	0	0	0	0	0	0				
Line.6846	1	0	0	0	0	0	0	0	0	0	0
Line.6846	2	0	0	0	0	0	0				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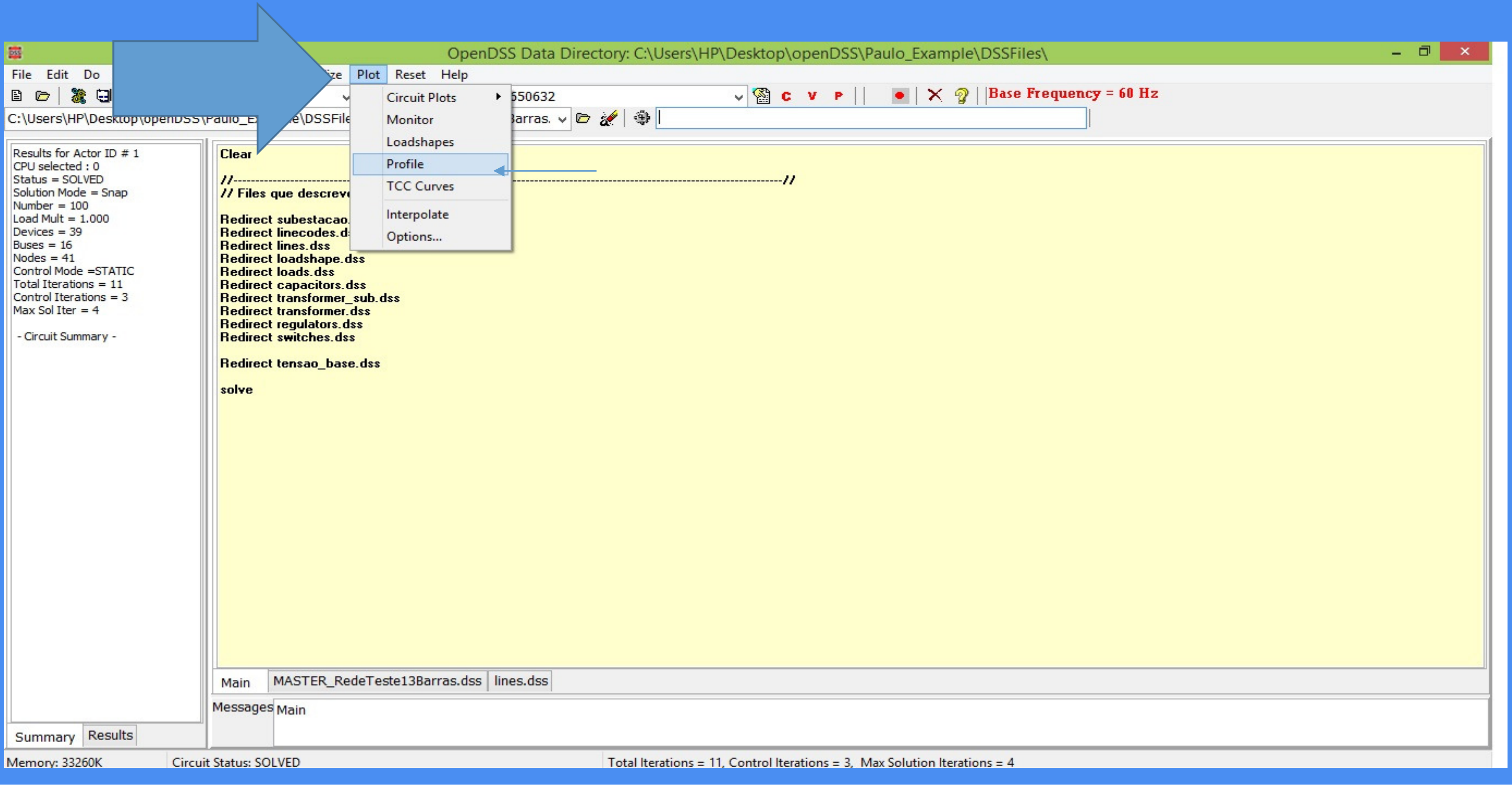
A1 | Element

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Element	Ntermina	Nconduct	P_1	Q_1	...													
2	Vsource.s	2	3	-1024.06	-612.708	-1242.12	-418.969	-1300.88	-704.685	0	0	0	0	0	0				
3	Line.6506	2	3	1252	684.989	972.788	379.027	1342.24	672.01	-1230.3	-604.532	-975.876	-346.388	-1300.14	-589.165				
4	Line.6326	2	3	1067.38	489.359	524.025	125.485	1100.62	361.613	-1064.22	-467.24	-525.978	-123.89	-1088.84	-343.852				
5	Line.6706	2	3	1047.22	457.24	459.98	85.8911	971.833	275.846	-1039.48	-413.027	-464.343	-83.2211	-952.488	-250.43				
6	Line.6716	2	3	-0.00087	-0.00834	0.001294	-0.00849	-0.00042	-0.00684	1.07E-12	-1.00E-13	-7.40E-12	-7.42E-12	7.49E-12	-5.73E-12				
7	Line.6326	2	3	162.918	115.173	121.61	92.9209	121.863	93.0576	-162.56	-114.647	-121.457	-92.6523	-121.55	-92.8058				
8	Line.6326	2	2	77.6598	134.495	330.242	127.982	-77.4483	-134.28	-327.694	-125.785								
9	Line.6456	2	2	77.4483	134.28	157.699	0.787801	-77.1835	-134.073	-157.436	-0.57811								
10	Line.6926	2	3	488.272	1.49902	68.3134	-156.95	290.631	26.462	-485.024	0.618705	-67.9973	157.447	-290.039	-26.5412				
11	Line.6716	2	2	122.993	82.4055	164.259	-14.9037	-122.785	-82.196	-163.887	15.1624								
12	Line.6846	2	1	163.887	-15.1624	-163.505	15.5487												
13	Line.6846	2	1	122.785	82.196	-121.994	-81.9651												
14	Capacitor.	2	3	0	-190.629	1.46E-14	-217.445	-1.46E-14	-185.488	0	0	0	0	0	0				
15	Capacitor.	2	1	0	-92.4923	0	0												
16	Transform	2	4	1024.06	612.708	1242.12	418.969	1300.88	704.684	0	0	-1252.01	-685.112	-972.794	-379.094	-1342.26	-672.147	0	0
17	Transform	2	4	162.56	114.647	121.457	92.6523	121.55	92.8058	0	0	-160.007	-110.005	-119.997	-89.9977	-120.011	-90.0087	0	0
18	Transform	2	2	1252.01	685.112	0	0	-1252	-684.989	0	0								
19	Transform	2	2	972.794	379.094	0	0	-972.788	-379.027	0	0								
20	Transform	2	2	1342.26	672.147	0	0	-1342.24	-672.01	0	0								
21	Line.6716	2	3	531.108	123.281	68.3181	-156.945	414.58	52.8336	-531.055	-123.228	-68.3134	156.95	-414.548	-52.8011				
22	Load.671	1	3	385.366	207.345	396.017	240.179	373.631	212.515										
23	Load.634a	1	2	160	110.007	0	0												

IEEE13BARRAS_EXP_ElemPowers

PERFIL DE TENSÃO


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
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Help
Circuit Plots
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Loadshapes
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Options...
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Base Frequency = 60 Hz
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e\DSSFile
Barras.
Main
MASTER_RedeTeste13Barras.dss
lines.dss
Messages
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Clear

//-------------------------------------------------------------------------------------------//
// Files que descreve

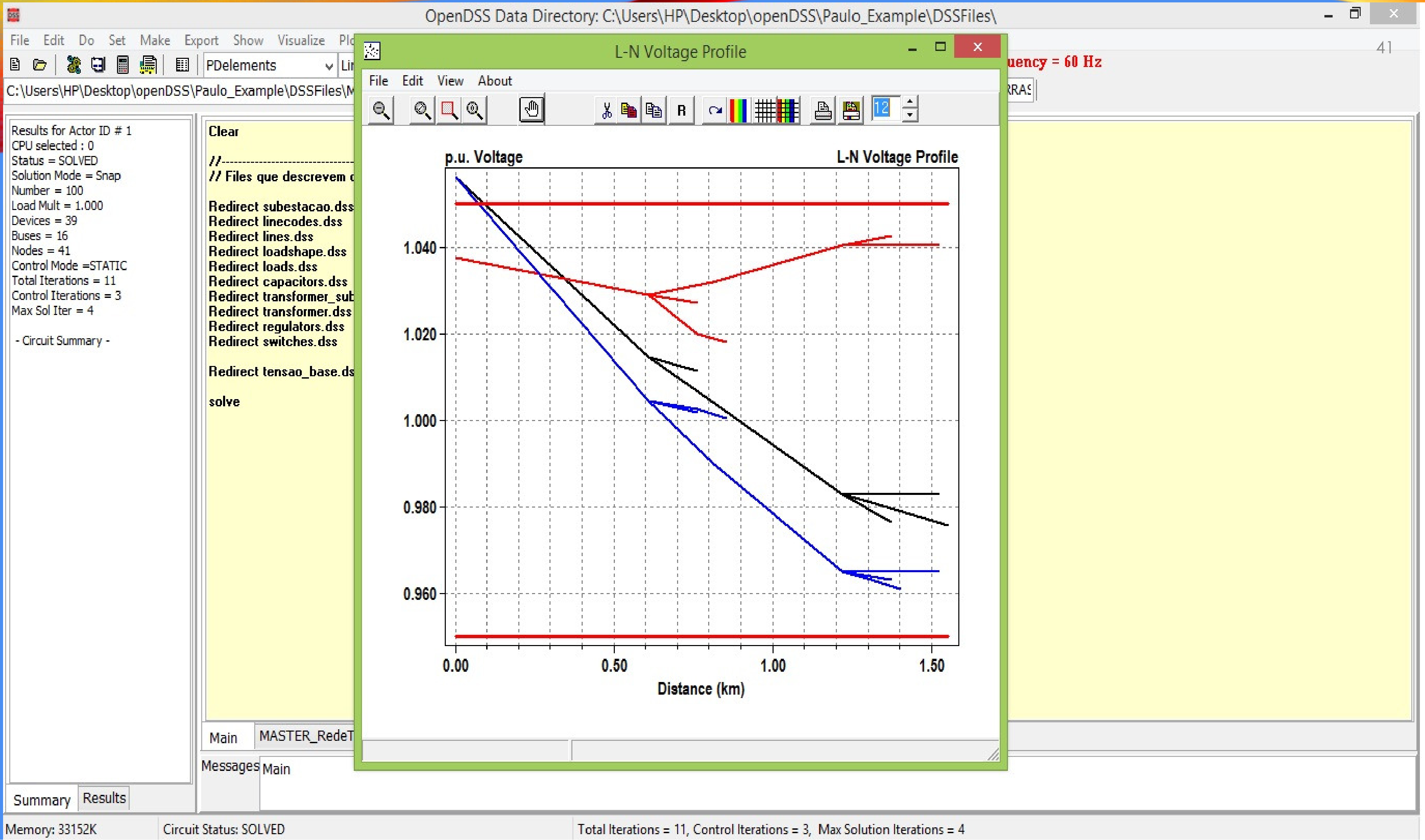
Redirect subestacao.
Redirect linecodes.d
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

solve
```

```
Main
```

```
Memory: 33260K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
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uency = 60 Hz
L-N Voltage Profile
File Edit View About
12
p.u. Voltage
L-N Voltage Profile
1.040
1.020
1.000
0.980
0.960
0.00
0.50
1.00
1.50
Distance (km)
Main
MASTER_RedeT
Messages
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Clear

//-----------------------------
// Files que descrevem c

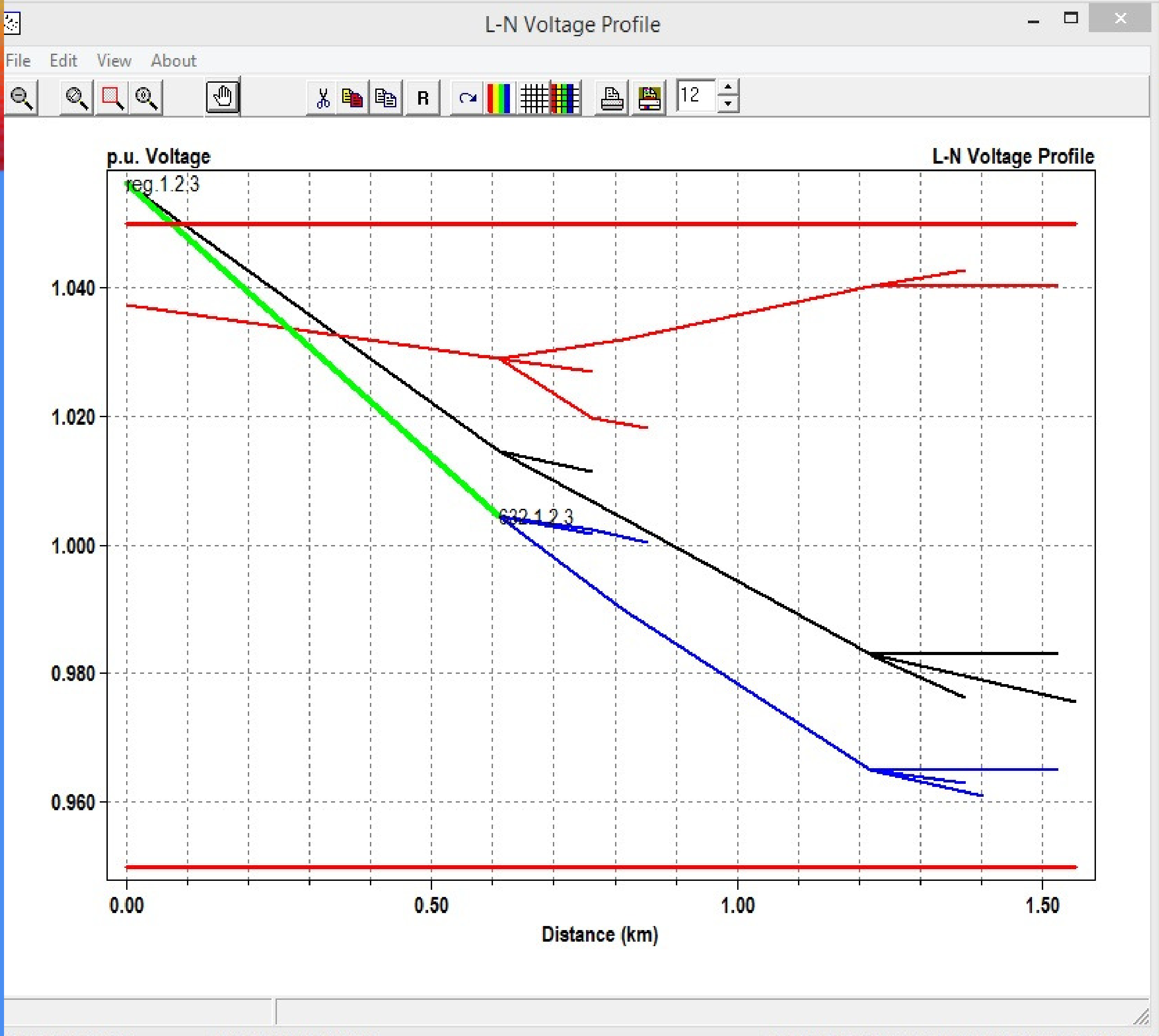
Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

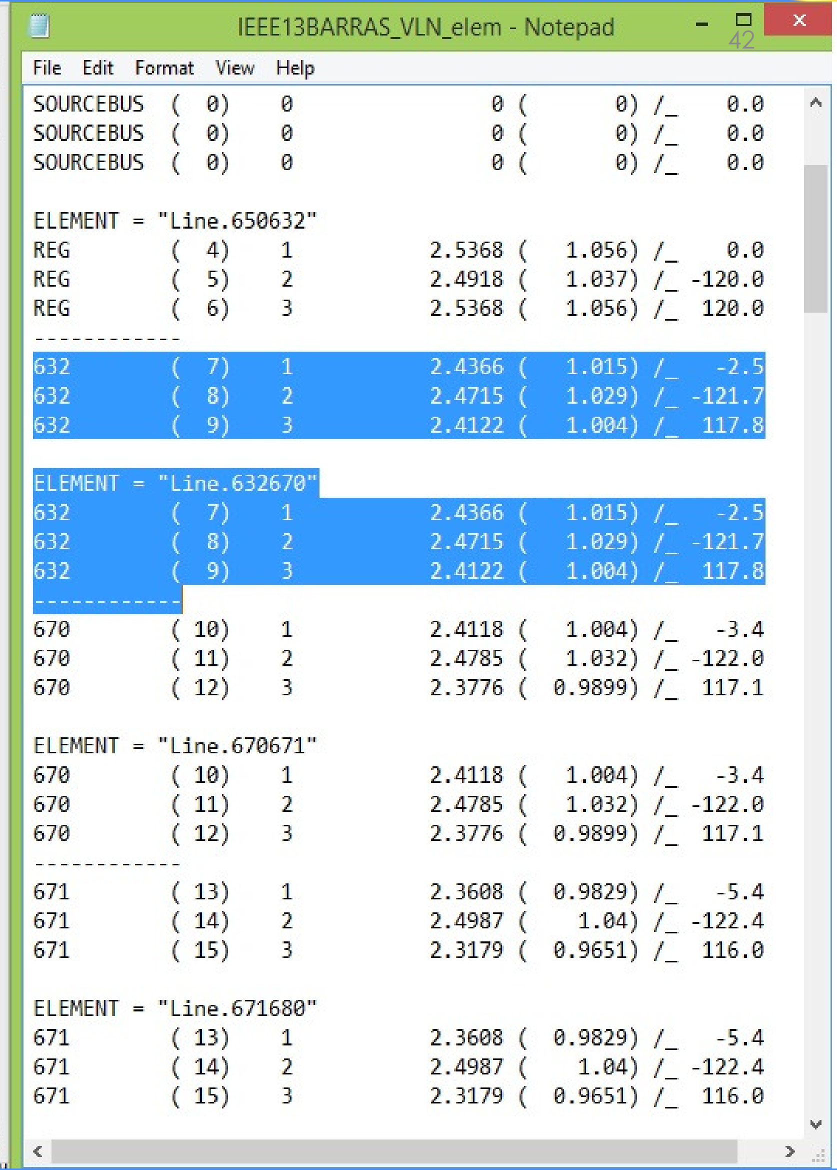
Redirect tensao_base.ds

solve
```

```
Main
```

```
Memory: 33152K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```





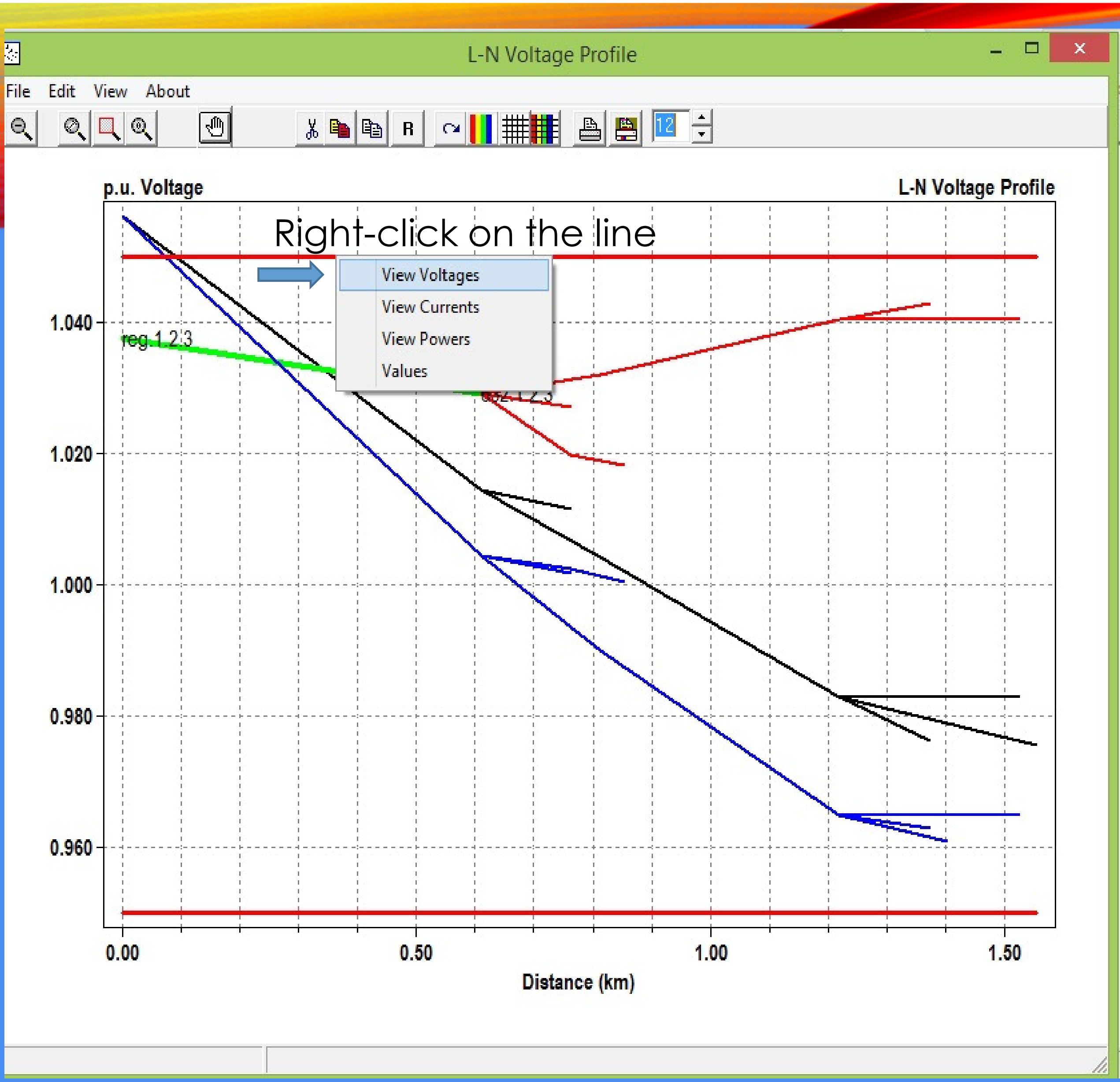
```
SOURCEBUS   (  0)   0           0 (       0) /_   0.0
SOURCEBUS   (  0)   0           0 (       0) /_   0.0
SOURCEBUS   (  0)   0           0 (       0) /_   0.0

ELEMENT = "Line.650632"
REG         (  4)   1      2.5368 (   1.056) /_   0.0
REG         (  5)   2      2.4918 (   1.037) /_ -120.0
REG         (  6)   3      2.5368 (   1.056) /_  120.0
------------
632         (  7)   1      2.4366 (   1.015) /_   -2.5
632         (  8)   2      2.4715 (   1.029) /_ -121.7
632         (  9)   3      2.4122 (   1.004) /_  117.8

ELEMENT = "Line.632670"
632         (  7)   1      2.4366 (   1.015) /_   -2.5
632         (  8)   2      2.4715 (   1.029) /_ -121.7
632         (  9)   3      2.4122 (   1.004) /_  117.8
------------
670         ( 10)   1      2.4118 (   1.004) /_   -3.4
670         ( 11)   2      2.4785 (   1.032) /_ -122.0
670         ( 12)   3      2.3776 (  0.9899) /_  117.1

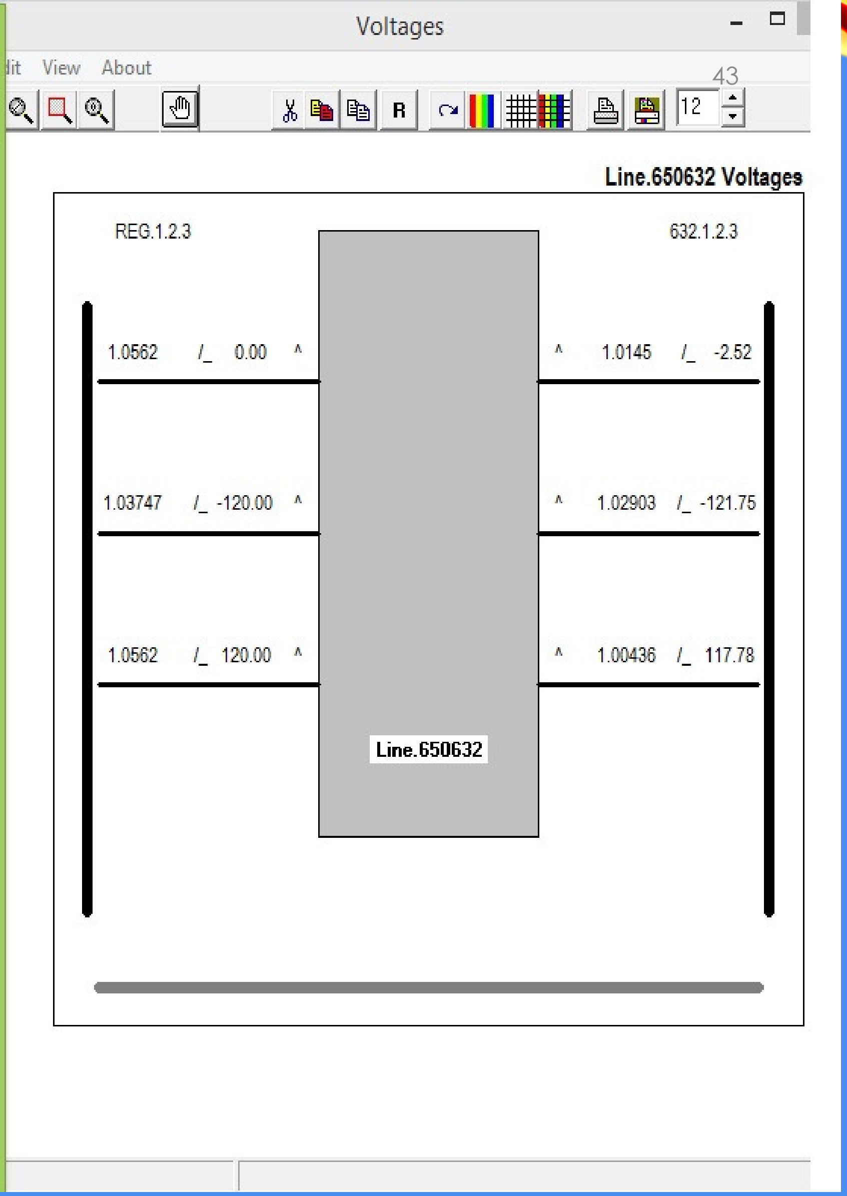
ELEMENT = "Line.670671"
670         ( 10)   1      2.4118 (   1.004) /_   -3.4
670         ( 11)   2      2.4785 (   1.032) /_ -122.0
670         ( 12)   3      2.3776 (  0.9899) /_  117.1
------------
671         ( 13)   1      2.3608 (  0.9829) /_   -5.4
671         ( 14)   2      2.4987 (    1.04) /_ -122.4
671         ( 15)   3      2.3179 (  0.9651) /_  116.0

ELEMENT = "Line.671680"
671         ( 13)   1      2.3608 (  0.9829) /_   -5.4
671         ( 14)   2      2.4987 (    1.04) /_ -122.4
671         ( 15)   3      2.3179 (  0.9651) /_  116.0
```



Right-click on the line

L-N Voltage Profile
File
Edit
View
About
12
View Voltages
View Currents
View Powers
Values
p.u. Voltage
L-N Voltage Profile
reg.1.2.3
632.1.2.3
1.040
1.020
1.000
0.980
0.960
0.00
0.50
1.00
1.50
Distance (km)

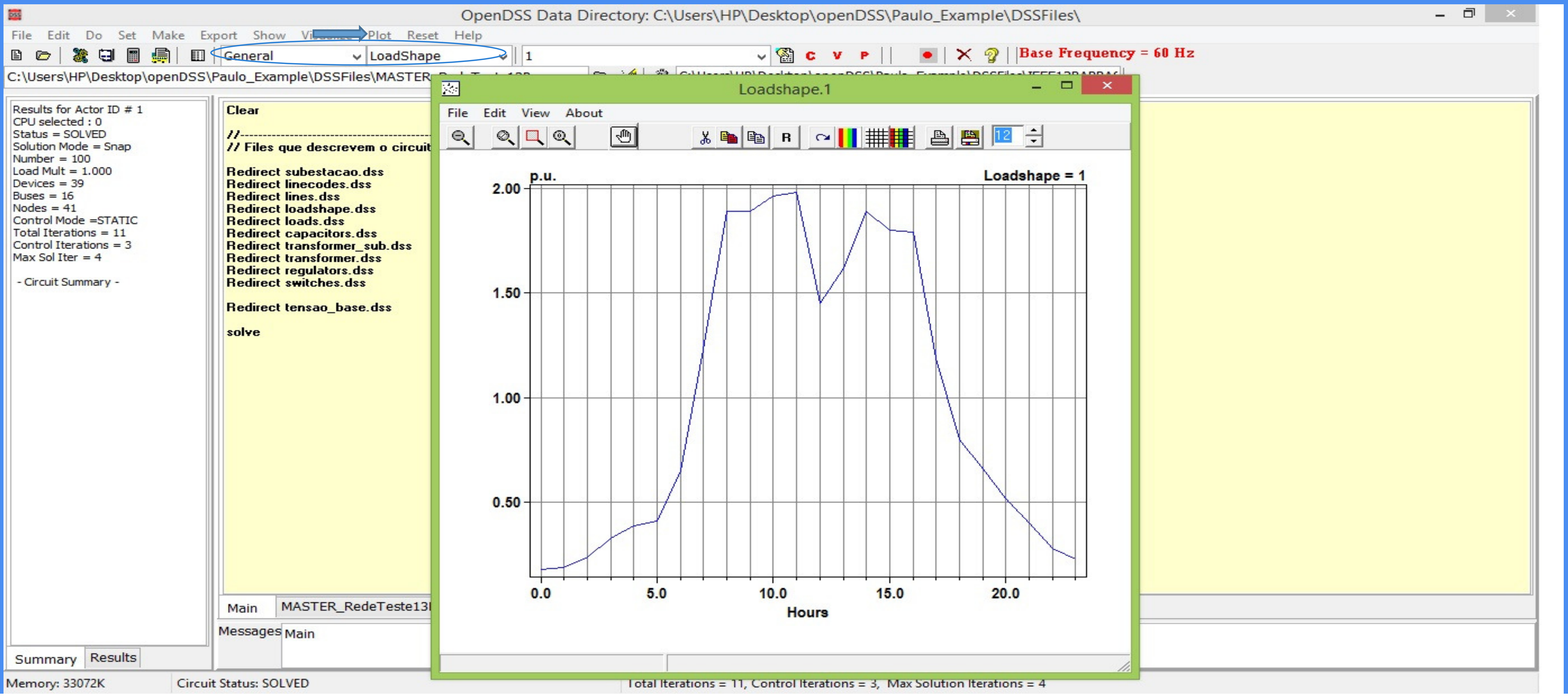


Voltages
dit
View
About
12
Line.650632

Line.650632 Voltages

REG.1.2.3	632.1.2.3
1.0562 /_ 0.00	1.0145 /_ -2.52
1.03747 /_ -120.00	1.02903 /_ -121.75
1.0562 /_ 120.00	1.00436 /_ 117.78

PREPARANDO AS CARGAS PARA O TIME-SERIES


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File
Edit
Do
Set
Make
Export
Show
Plot
Reset
Help
General
LoadShape
1
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER
Loadshape.1
File
Edit
View
About
p.u.
Loadshape = 1
2.00
1.50
1.00
0.50
0.0
5.0
10.0
15.0
20.0
Hours
Main
MASTER_RedeTeste13
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
Clear

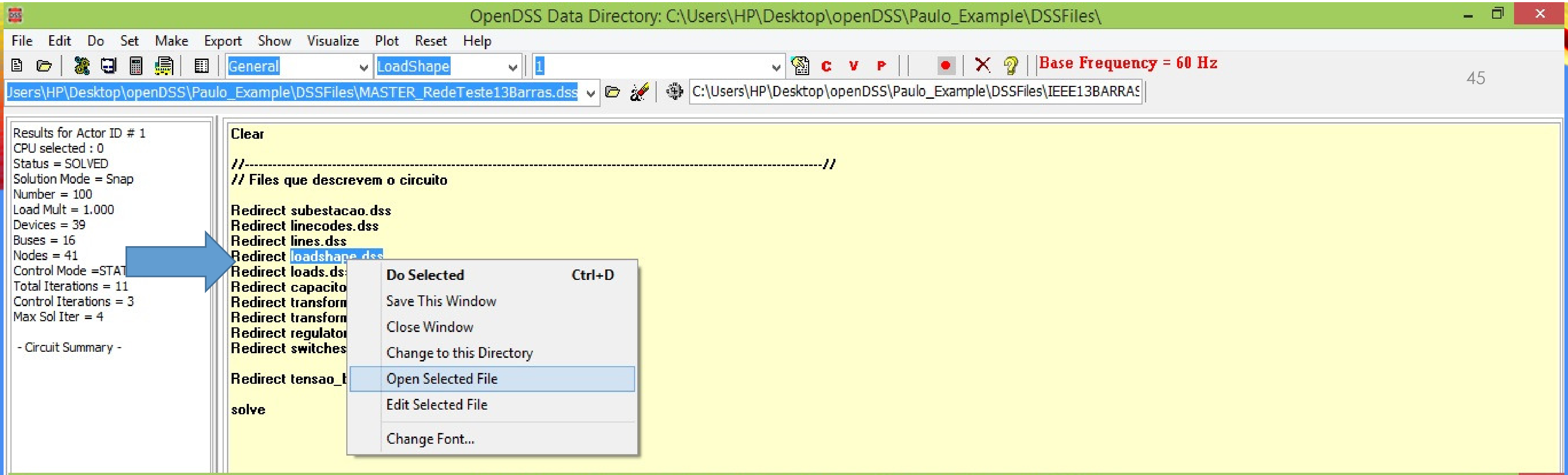
//-----------------------------------------
// Files que descrevem o circuit

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

solve
```

```
Memory: 33072K    Circuit Status: SOLVED    Total Iterations = 11, Control Iterations = 3,  Max Solution Iterations = 4
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
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1
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
Do Selected Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STAT
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

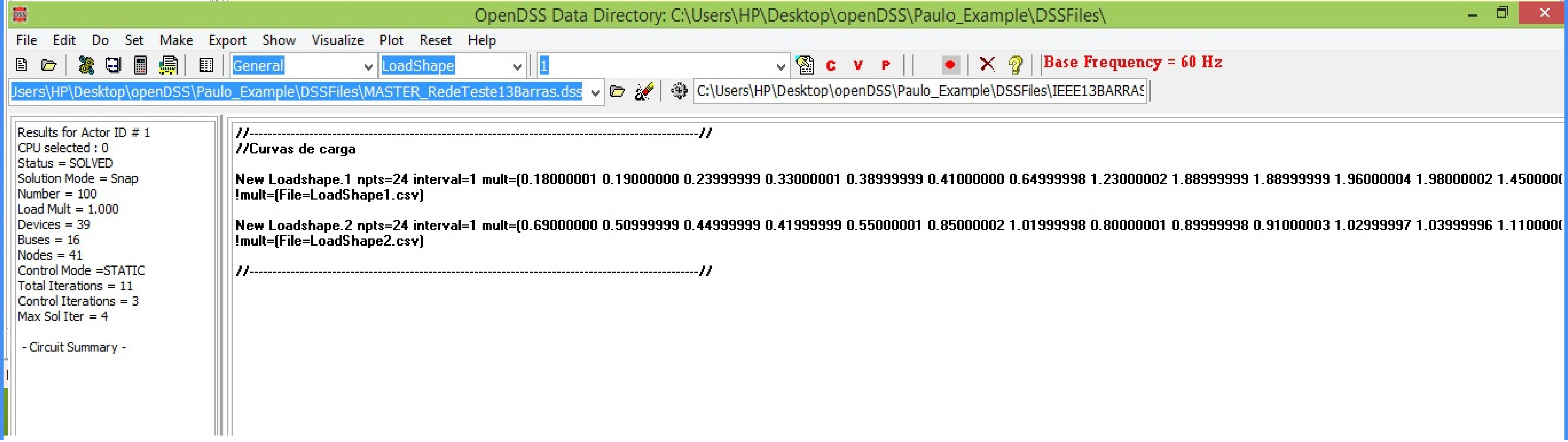
```
Clear

//----------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.ds
Redirect capacito
Redirect transforn
Redirect transforn
Redirect regulator
Redirect switches

Redirect tensao_t

solve
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
1
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

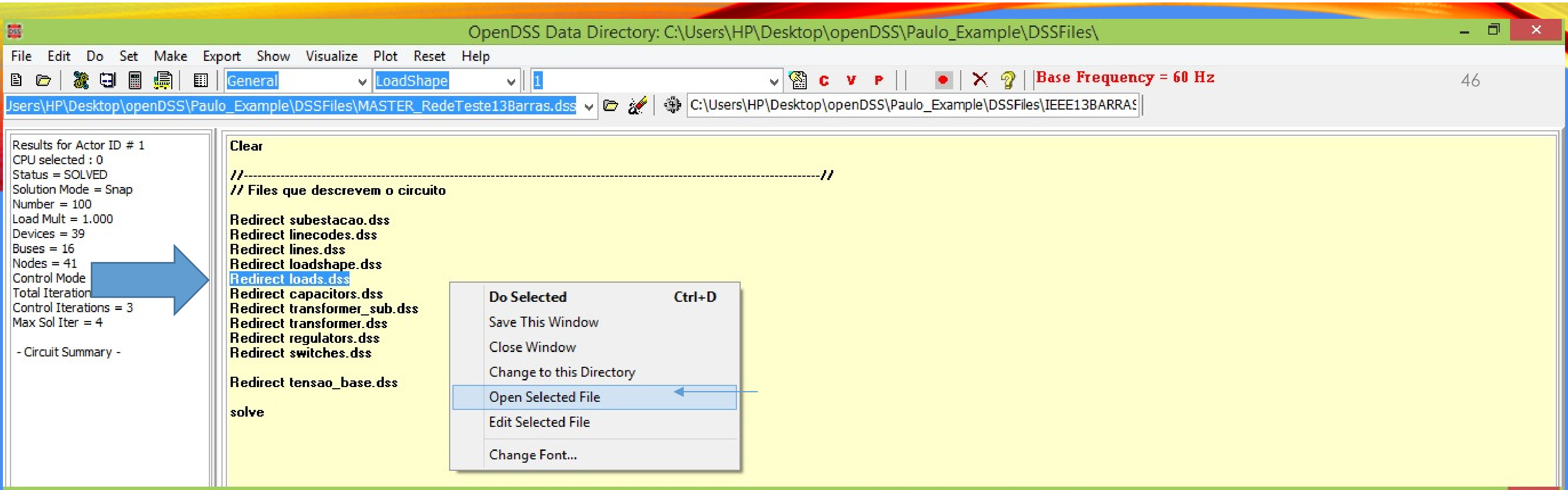
 - Circuit Summary -
```

```
//------------------------------------------------------------------------------------------//
//Curvas de carga

New Loadshape.1 npts=24 interval=1 mult=(0.18000001 0.19000000 0.23999999 0.33000001 0.38999999 0.41000000 0.64999998 1.23000002 1.88999999 1.88999999 1.96000004 1.98000002 1.450000
!mult=(File=LoadShape1.csv)

New Loadshape.2 npts=24 interval=1 mult=(0.69000000 0.50999999 0.44999999 0.41999999 0.55000001 0.85000002 1.01999998 0.80000001 0.89999998 0.91000003 1.02999997 1.03999996 1.110000
!mult=(File=LoadShape2.csv)

//------------------------------------------------------------------------------------------//
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
1
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
Do Selected Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode
Total Iteration
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

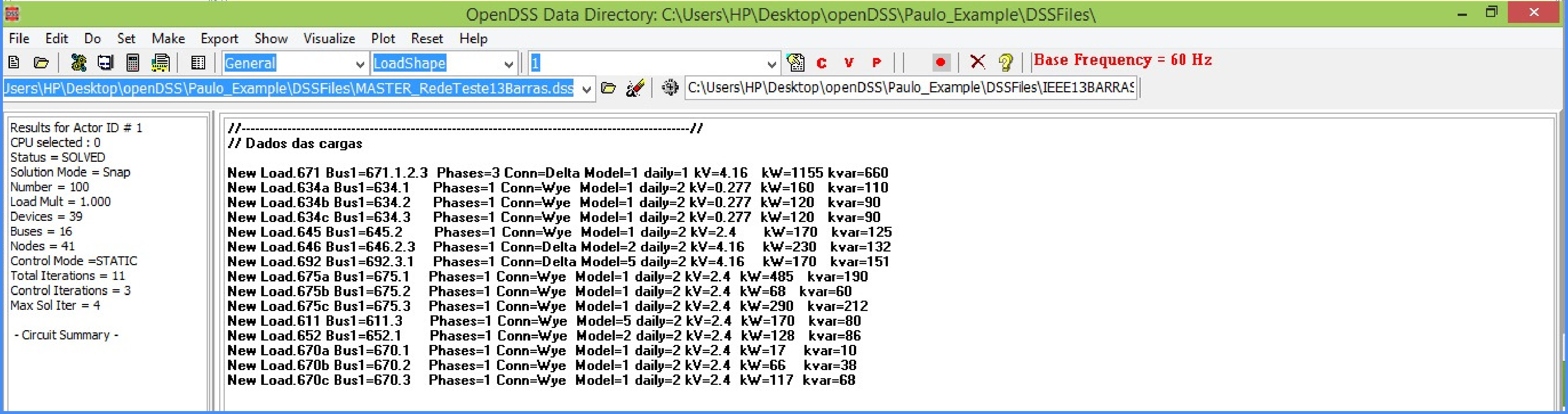
```
Clear

//----------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

solve
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
1
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS

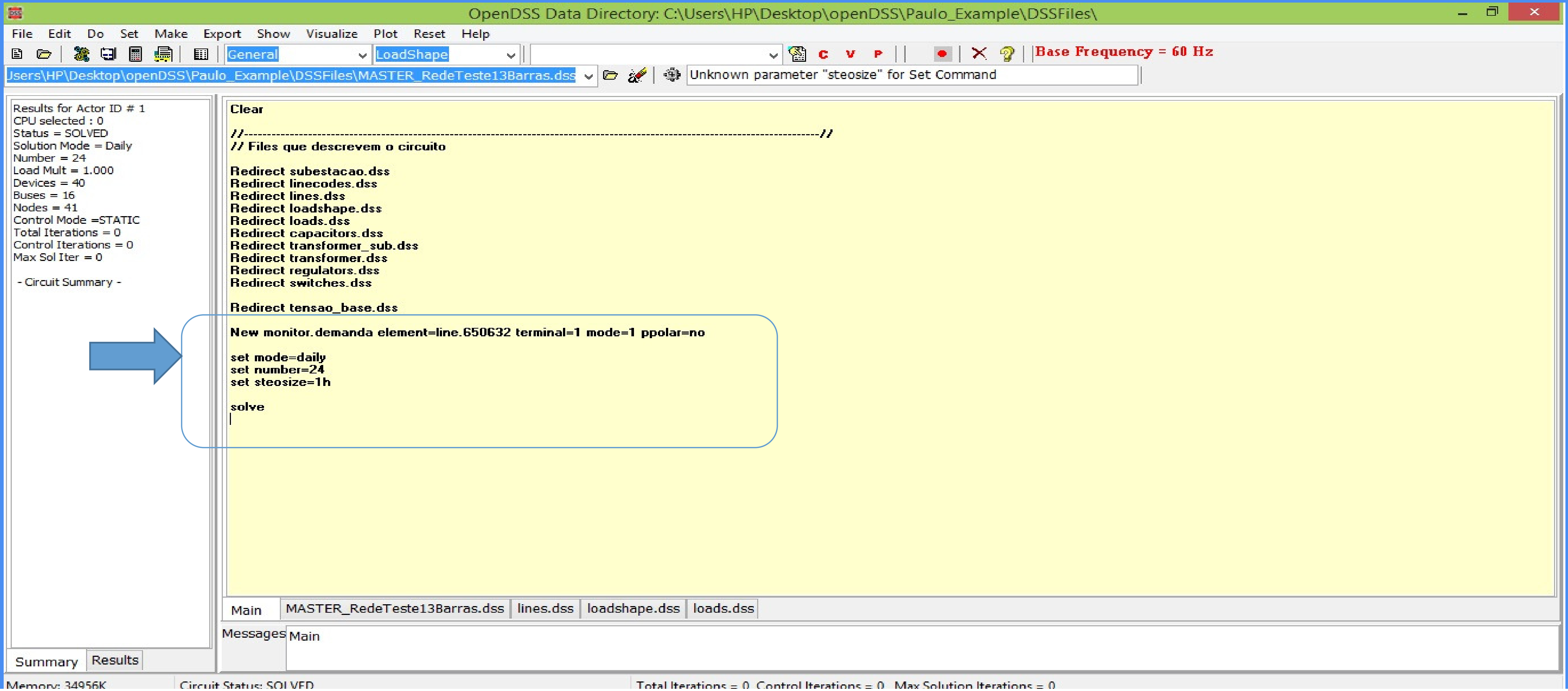
```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 39
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 11
Control Iterations = 3
Max Sol Iter = 4

 - Circuit Summary -
```

```
//-----------------------------------------------------------------------------------------------//
// Dados das cargas

New Load.671 Bus1=671.1.2.3  Phases=3 Conn=Delta Model=1 daily=1 kV=4.16   kW=1155 kvar=660
New Load.634a Bus1=634.1     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=160   kvar=110
New Load.634b Bus1=634.2     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=120   kvar=90
New Load.634c Bus1=634.3     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=120   kvar=90
New Load.645 Bus1=645.2      Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4     kW=170   kvar=125
New Load.646 Bus1=646.2.3    Phases=1 Conn=Delta Model=2 daily=2 kV=4.16    kW=230   kvar=132
New Load.692 Bus1=692.3.1    Phases=1 Conn=Delta Model=5 daily=2 kV=4.16    kW=170   kvar=151
New Load.675a Bus1=675.1    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=485   kvar=190
New Load.675b Bus1=675.2    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=68   kvar=60
New Load.675c Bus1=675.3    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=290   kvar=212
New Load.611 Bus1=611.3      Phases=1 Conn=Wye  Model=5 daily=2 kV=2.4  kW=170   kvar=80
New Load.652 Bus1=652.1      Phases=1 Conn=Wye  Model=2 daily=2 kV=2.4  kW=128   kvar=86
New Load.670a Bus1=670.1    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=17    kvar=10
New Load.670b Bus1=670.2    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=66    kvar=38
New Load.670c Bus1=670.3    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=117  kvar=68
```

RESULTADOS DO TIME-SERIES


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
General
LoadShape
C
V
P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
Summary
Results
Messages

OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\

Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss

```
Unknown parameter "steosize" for Set Command
```

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 40
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 0
Control Iterations = 0
Max Sol Iter = 0

 - Circuit Summary -
```

```
Clear

//------------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

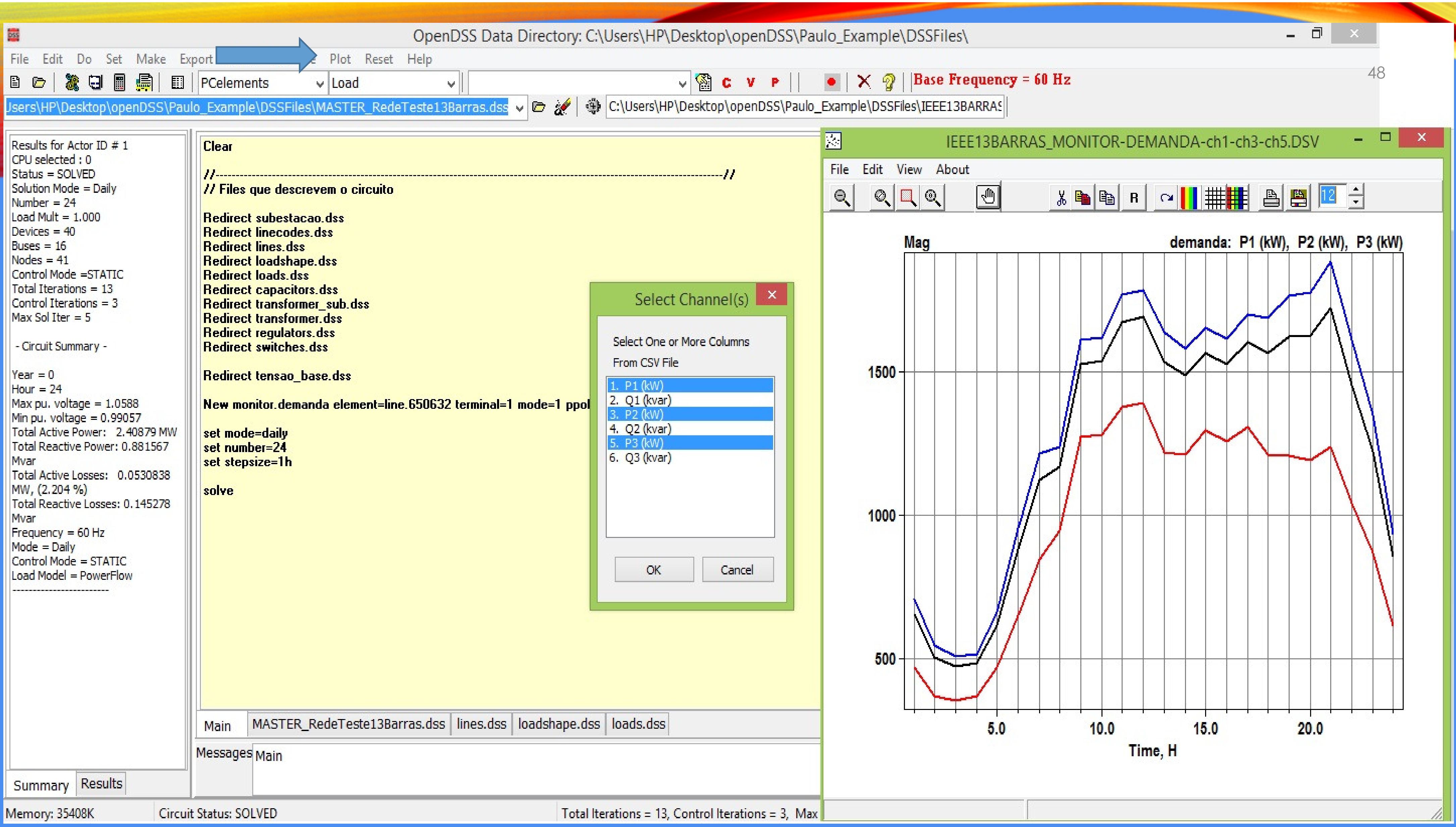
New monitor.demanda element=line.650632 terminal=1 mode=1 ppolar=no

set mode=daily
set number=24
set steosize=1h

solve
```

Messages: Main

Memory: 34956K | Circuit Status: SOLVED | Total Iterations = 0 Control Iterations = 0 Max Solution Iterations = 0


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Plot Reset Help
PCelements
Load
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
Summary
Results
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
Messages
Main
Memory: 35408K
Circuit Status: SOLVED
Total Iterations = 13, Control Iterations = 3, Max
Select Channel(s)
Select One or More Columns
From CSV File
1. P1 (kW)
2. Q1 (kvar)
3. P2 (kW)
4. Q2 (kvar)
5. P3 (kW)
6. Q3 (kvar)
OK
Cancel
IEEE13BARRAS_MONITOR-DEMANDA-ch1-ch3-ch5.DSV
File Edit View About
R
12
Mag
demanda: P1 (kW), P2 (kW), P3 (kW)
1500
1000
500
5.0
10.0
15.0
20.0
Time, H

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 40
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881567
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145278
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

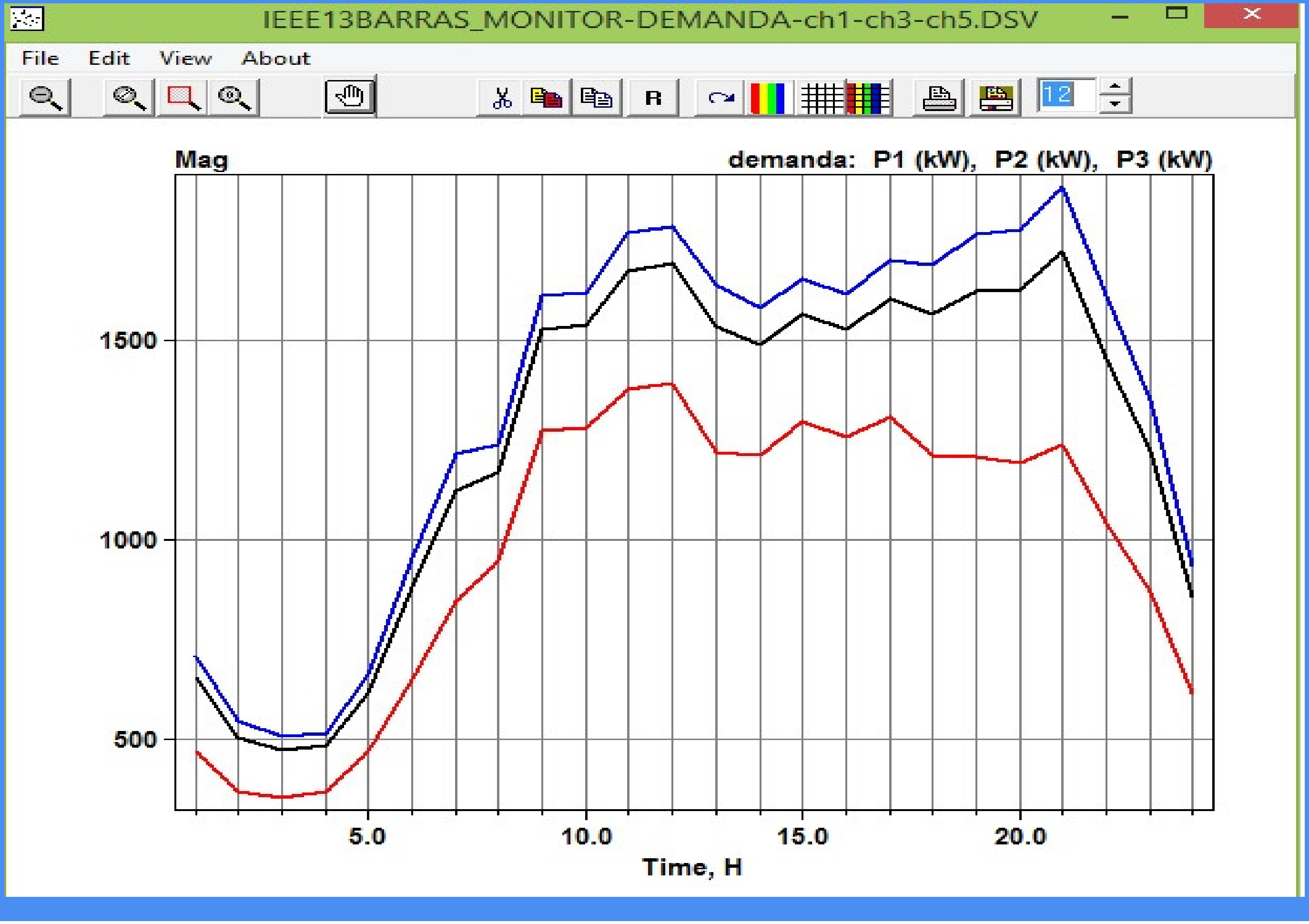
Redirect tensao_base.dss

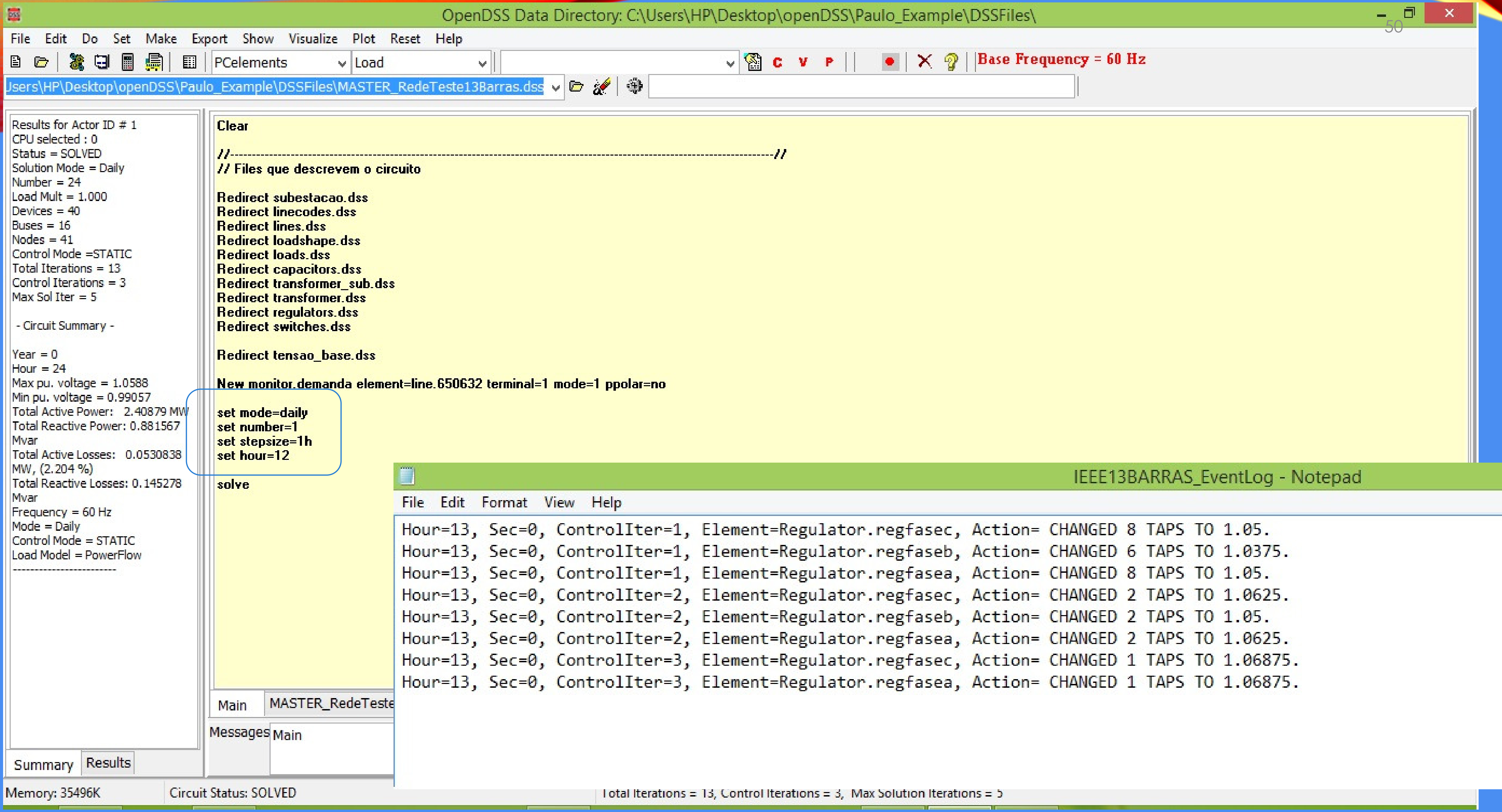
New monitor.demanda element=line.650632 terminal=1 mode=1 ppol

set mode=daily
set number=24
set stepsize=1h

solve
```

RESULTADOS DE UMA HORA DO DIA




OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
PCelements
Load
C
V
P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
Main
MASTER_RedeTeste
Messages
Main
Summary
Results
IEEE13BARRAS_EventLog - Notepad
File
Edit
Format
View
Help

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 40
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881567
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145278
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
-----------------------
```

```
Clear

//-----------------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect tensao_base.dss

New monitor.demanda element=line.650632 terminal=1 mode=1 ppolar=no

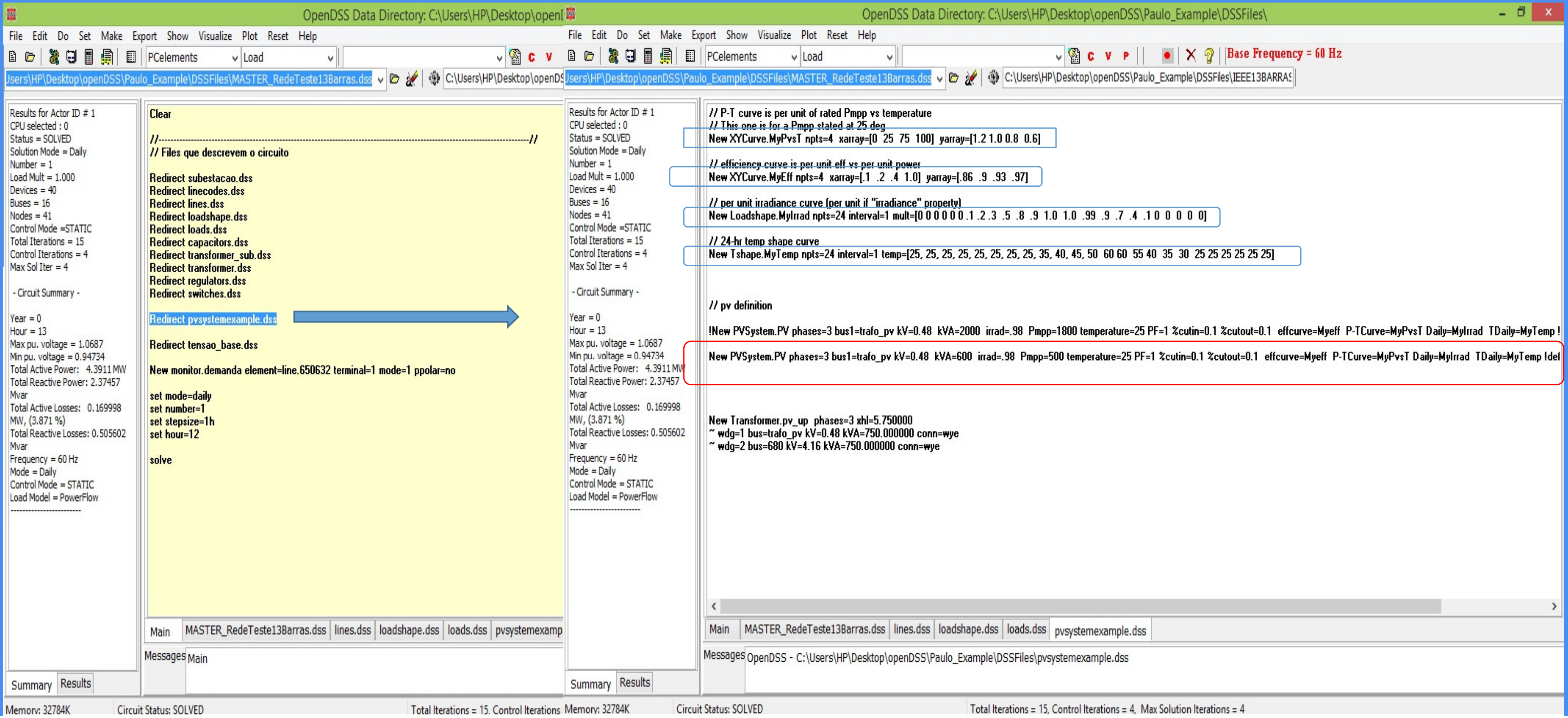
set mode=daily
set number=1
set stepsize=1h
set hour=12

solve
```

```
Hour=13, Sec=0, ControlIter=1, Element=Regulator.regfasec, Action= CHANGED 8 TAPS TO 1.05.
Hour=13, Sec=0, ControlIter=1, Element=Regulator.regfaseb, Action= CHANGED 6 TAPS TO 1.0375.
Hour=13, Sec=0, ControlIter=1, Element=Regulator.regfasea, Action= CHANGED 8 TAPS TO 1.05.
Hour=13, Sec=0, ControlIter=2, Element=Regulator.regfasec, Action= CHANGED 2 TAPS TO 1.0625.
Hour=13, Sec=0, ControlIter=2, Element=Regulator.regfaseb, Action= CHANGED 2 TAPS TO 1.05.
Hour=13, Sec=0, ControlIter=2, Element=Regulator.regfasea, Action= CHANGED 2 TAPS TO 1.0625.
Hour=13, Sec=0, ControlIter=3, Element=Regulator.regfasec, Action= CHANGED 1 TAPS TO 1.06875.
Hour=13, Sec=0, ControlIter=3, Element=Regulator.regfasea, Action= CHANGED 1 TAPS TO 1.06875.
```

```
Memory: 35496K     Circuit Status: SOLVED     Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

PV SYSTEM


OpenDSS Data Directory: C:\Users\HP\Desktop\openI
File Edit Do Set Make Export Show Visualize Plot Reset Help
PCelements
Load
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDS
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexamp
Messages
Summary
Results
OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
pvsystemexample.dss

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 1
Load Mult = 1.000
Devices = 40
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 15
Control Iterations = 4
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 13
Max pu. voltage = 1.0687
Min pu. voltage = 0.94734
Total Active Power:   4.3911 MW
Total Reactive Power: 2.37457
Mvar
Total Active Losses:   0.169998
MW, (3.871 %)
Total Reactive Losses: 0.505602
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//------------------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

Redirect tensao_base.dss

New monitor.demanda element=line.650632 terminal=1 mode=1 ppolar=no

set mode=daily
set number=1
set stepsize=1h
set hour=12

solve
```

Messages Main

Memory: 32784K   Circuit Status: SOLVED   Total Iterations = 15, Control Iterations

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 1
Load Mult = 1.000
Devices = 40
Buses = 16
Nodes = 41
Control Mode =STATIC
Total Iterations = 15
Control Iterations = 4
Max Sol Iter = 4

 - Circuit Summary -

Year = 0
Hour = 13
Max pu. voltage = 1.0687
Min pu. voltage = 0.94734
Total Active Power:   4.3911 MW
Total Reactive Power: 2.37457
Mvar
Total Active Losses:   0.169998
MW, (3.871 %)
Total Reactive Losses: 0.505602
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
// P-T curve is per unit of rated Pmpp vs temperature
// This one is for a Pmpp stated at 25 deg
New XYCurve.MyPvsT npts=4  xarray=[0  25  75  100]  yarray=[1.2 1.0 0.8  0.6]

// efficiency curve is per unit eff vs per unit power
New XYCurve.MyEff npts=4  xarray=[.1  .2  .4  1.0]  yarray=[.86  .9  .93  .97]

// per unit irradiance curve (per unit if "irradiance" property)
New Loadshape.MyIrrad npts=24 interval=1 mult=[0 0 0 0 0 0 .1 .2 .3  .5  .8  .9  1.0  1.0  .99  .9  .7  .4  .1 0  0  0  0  0]

// 24-hr temp shape curve
New Tshape.MyTemp npts=24 interval=1 temp=[25, 25, 25, 25, 25, 25, 25, 25, 35, 40, 45, 50  60 60  55 40  35  30  25 25 25 25 25 25]


// pv definition

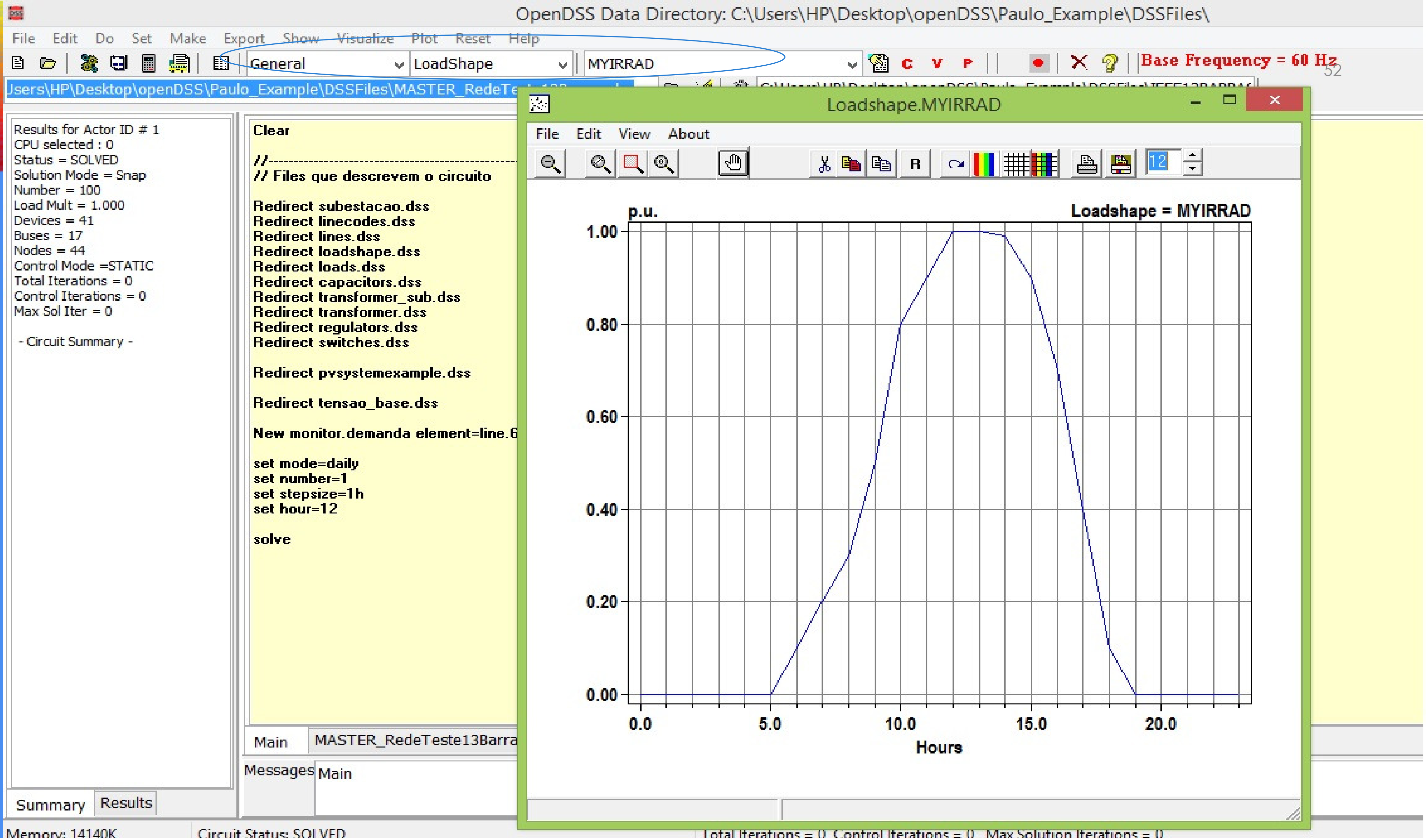
!New PVSystem.PV phases=3 bus1=trafo_pv kV=0.48  kVA=2000  irrad=.98  Pmpp=1800 temperature=25 PF=1 %cutin=0.1 %cutout=0.1  effcurve=Myeff  P-TCurve=MyPvsT Daily=MyIrrad  TDaily=MyTemp !

New PVSystem.PV phases=3 bus1=trafo_pv kV=0.48  kVA=600  irrad=.98  Pmpp=500 temperature=25 PF=1 %cutin=0.1 %cutout=0.1  effcurve=Myeff  P-TCurve=MyPvsT Daily=MyIrrad  TDaily=MyTemp !del


New Transformer.pv_up  phases=3 xhl=5.750000
~ wdg=1 bus=trafo_pv kV=0.48 kVA=750.000000 conn=wye
~ wdg=2 bus=680 kV=4.16 kVA=750.000000 conn=wye
```

Messages OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\pvsystemexample.dss

Memory: 32784K   Circuit Status: SOLVED   Total Iterations = 15, Control Iterations = 4, Max Solution Iterations = 4



OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
MYIRRAD
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTe
Loadshape.MYIRRAD
File Edit View About
12
p.u.
Loadshape = MYIRRAD
1.00
0.80
0.60
0.40
0.20
0.00
0.0
5.0
10.0
15.0
20.0
Hours
Main
MASTER_RedeTeste13Barra
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 41
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 0
Control Iterations = 0
Max Sol Iter = 0

 - Circuit Summary -
```

```
Clear

//-----------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

Redirect tensao_base.dss

New monitor.demanda element=line.6

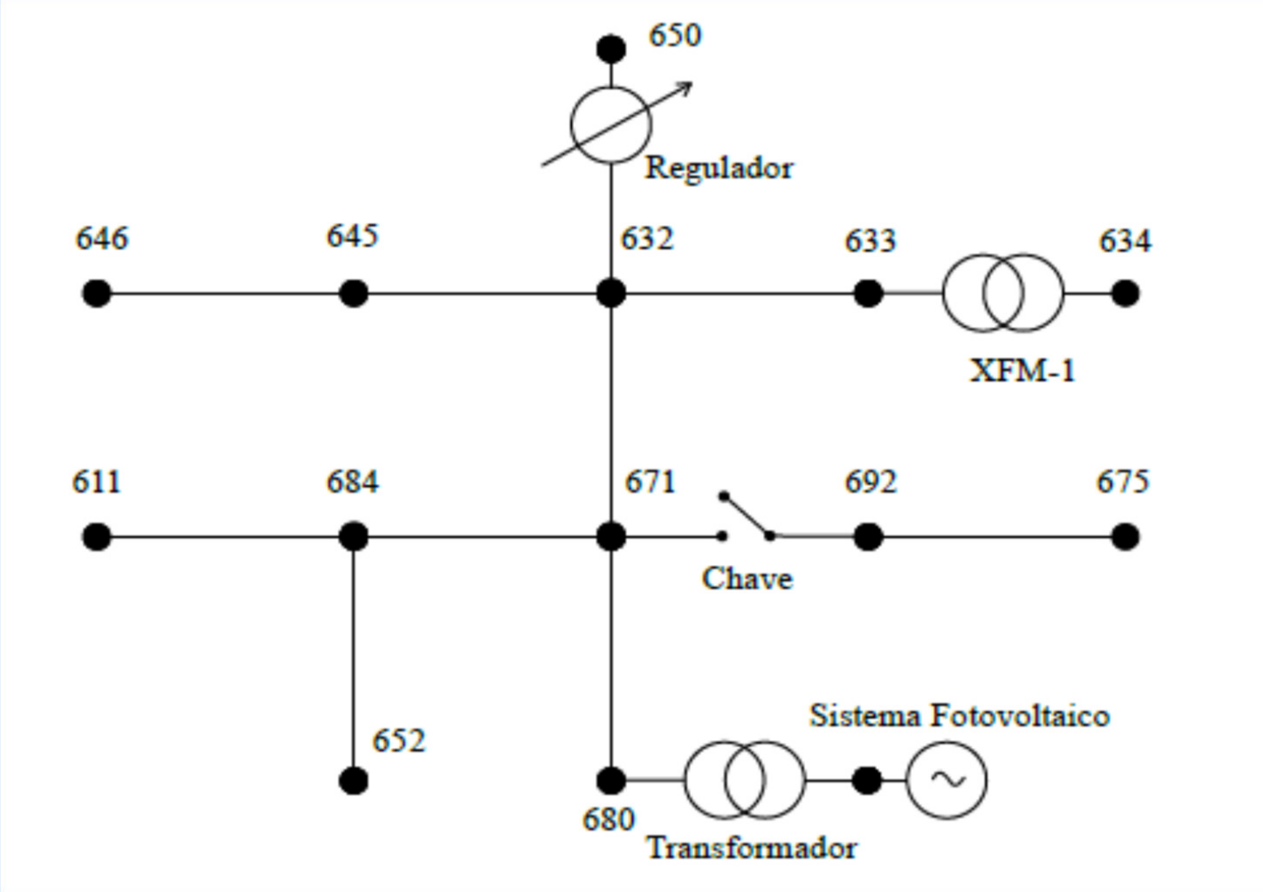
set mode=daily
set number=1
set stepsize=1h
set hour=12

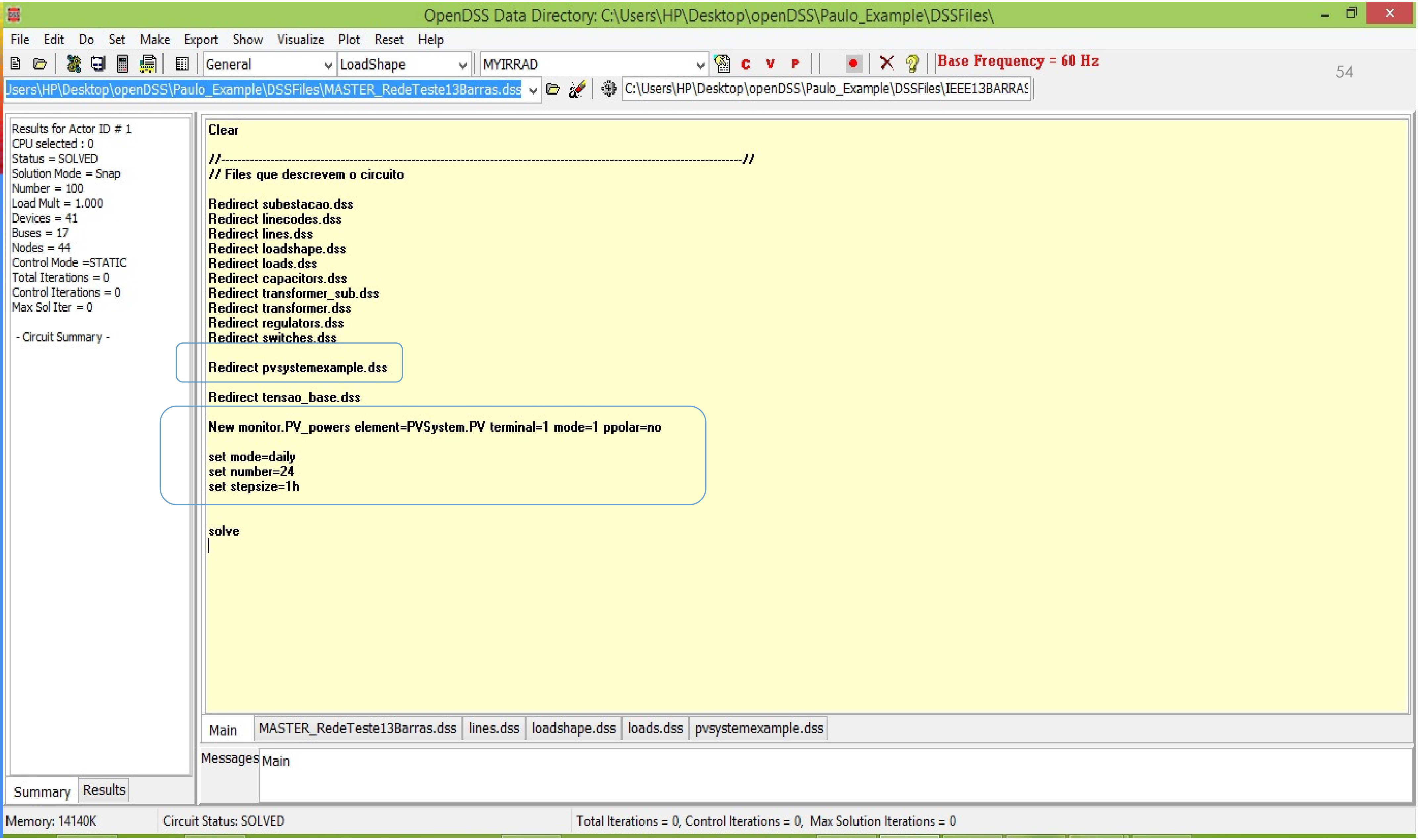
solve
```

```
Memory: 14140K    Circuit Status: SOLVED    Total Iterations = 0  Control Iterations = 0  Max Solution Iterations = 0
```

PV SYSTEM RESULTADOS

Fig: Diagrama unifilar da rede teste IEEE 13 barras com a presença do sistema fotovoltaico


650
Regulador
646
645
632
633
634
XFM-1
611
684
671
692
675
Chave
652
Sistema Fotovoltaico
680
Transformador


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
MYIRRAD
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Snap
Number = 100
Load Mult = 1.000
Devices = 41
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 0
Control Iterations = 0
Max Sol Iter = 0

 - Circuit Summary -
```

```
Clear

//---------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

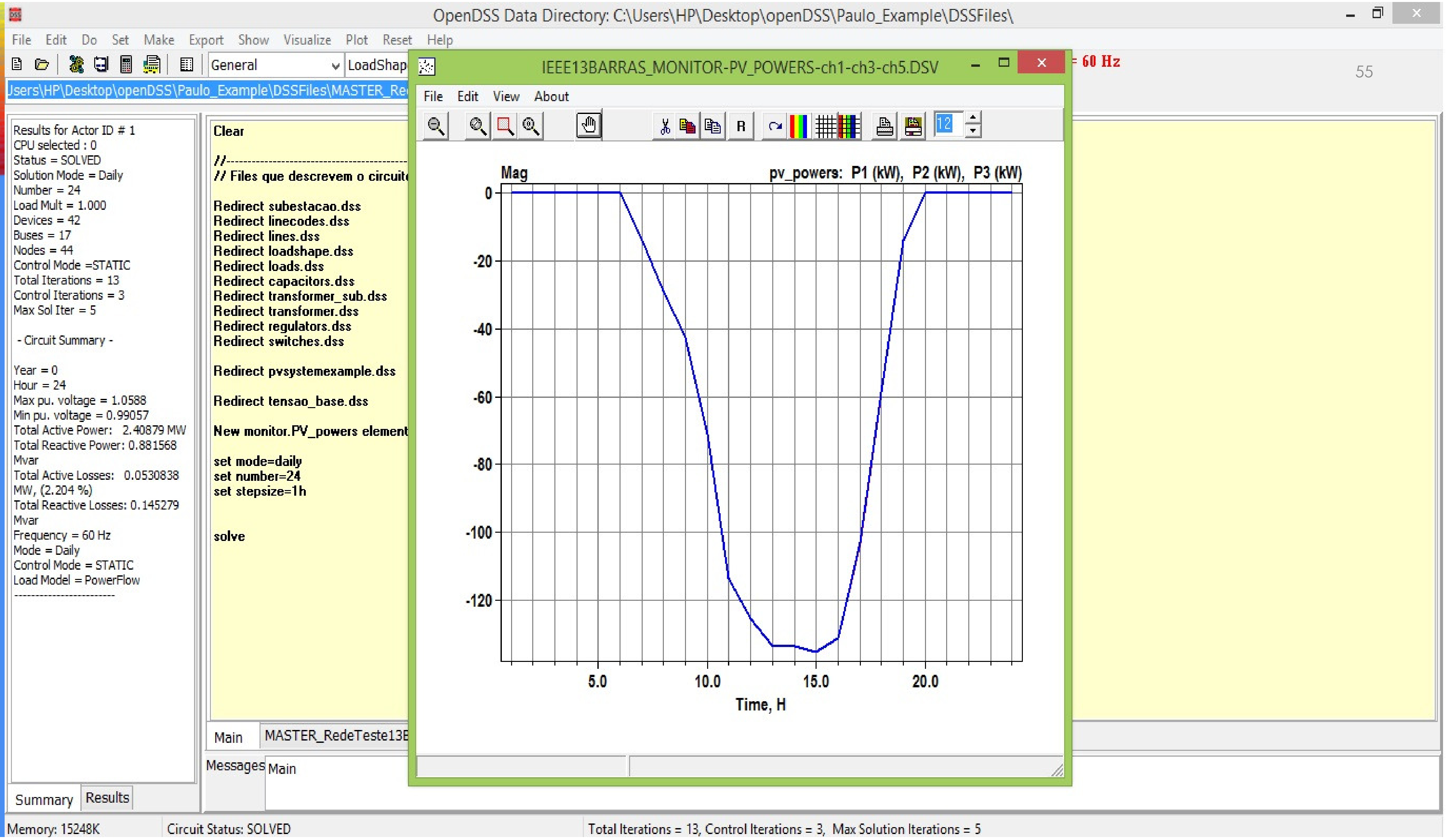
Redirect tensao_base.dss

New monitor.PV_powers element=PVSystem.PV terminal=1 mode=1 ppolar=no

set mode=daily
set number=24
set stepsize=1h


solve
```

Memory: 14140K
Circuit Status: SOLVED
Total Iterations = 0, Control Iterations = 0, Max Solution Iterations = 0



OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShap
Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_Re
= 60 Hz
IEEE13BARRAS_MONITOR-PV_POWERS-ch1-ch3-ch5.DSV
File Edit View About
R
12
Mag
pv_powers: P1 (kW), P2 (kW), P3 (kW)
0
-20
-40
-60
-80
-100
-120
5.0
10.0
15.0
20.0
Time, H
Main
MASTER_RedeTeste13E
Messages
Main
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 42
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//------------------------------------------
// Files que descrevem o circuit

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

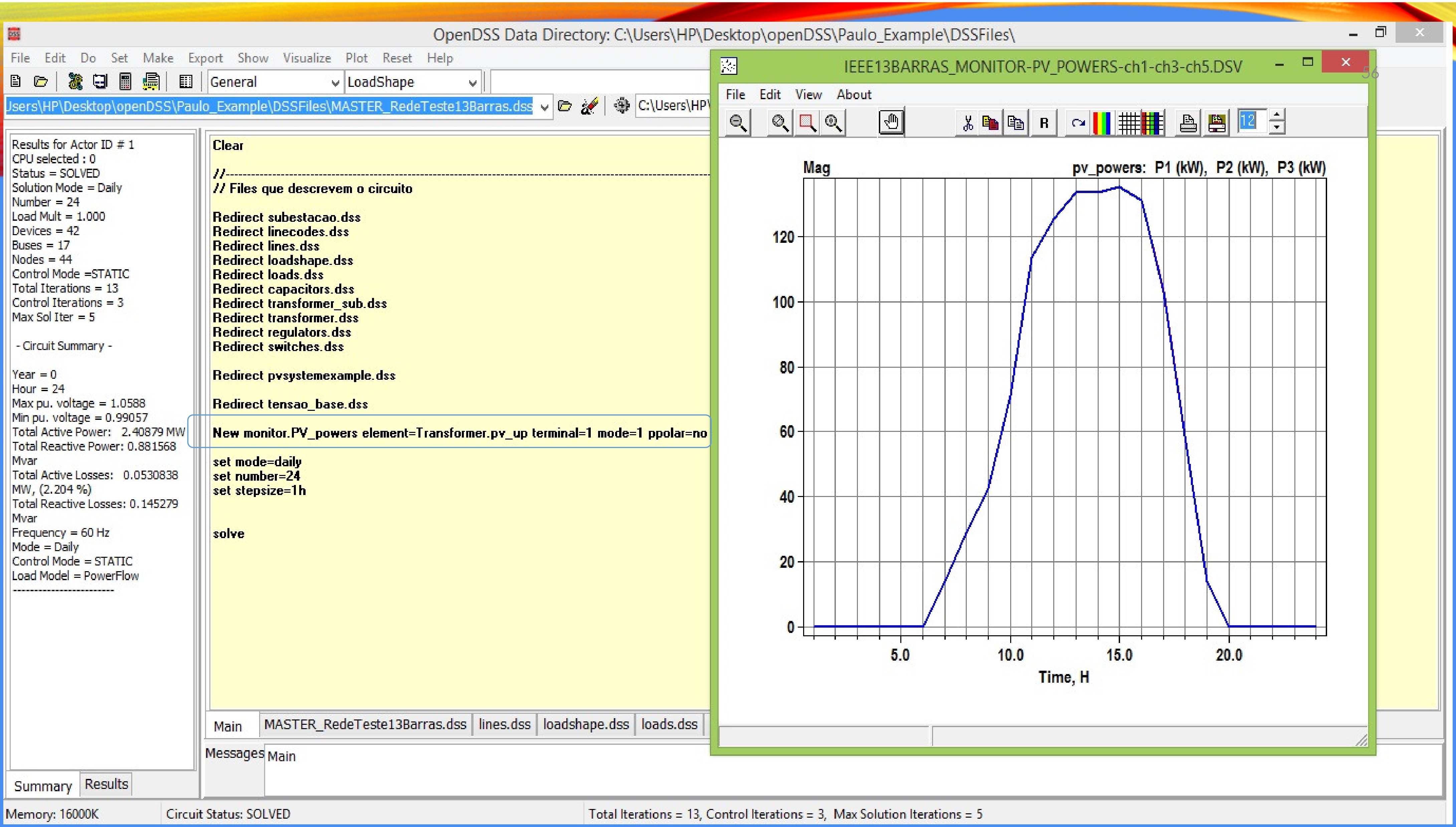
Redirect tensao_base.dss

New monitor.PV_powers element

set mode=daily
set number=24
set stepsize=1h


solve
```

```
Memory: 15248K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\
IEEE13BARRAS_MONITOR-PV_POWERS-ch1-ch3-ch5.DSV
File Edit View About
R
12
Mag
pv_powers: P1 (kW), P2 (kW), P3 (kW)
120
100
80
60
40
20
0
5.0
10.0
15.0
20.0
Time, H
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
Messages
Main
Summary
Results

Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 42
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

- Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power: 2.40879 MW
Total Reactive Power: 0.881568 Mvar
Total Active Losses: 0.0530838 MW, (2.204 %)
Total Reactive Losses: 0.145279 Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow

```
Clear

//-----------------------------------------------------------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

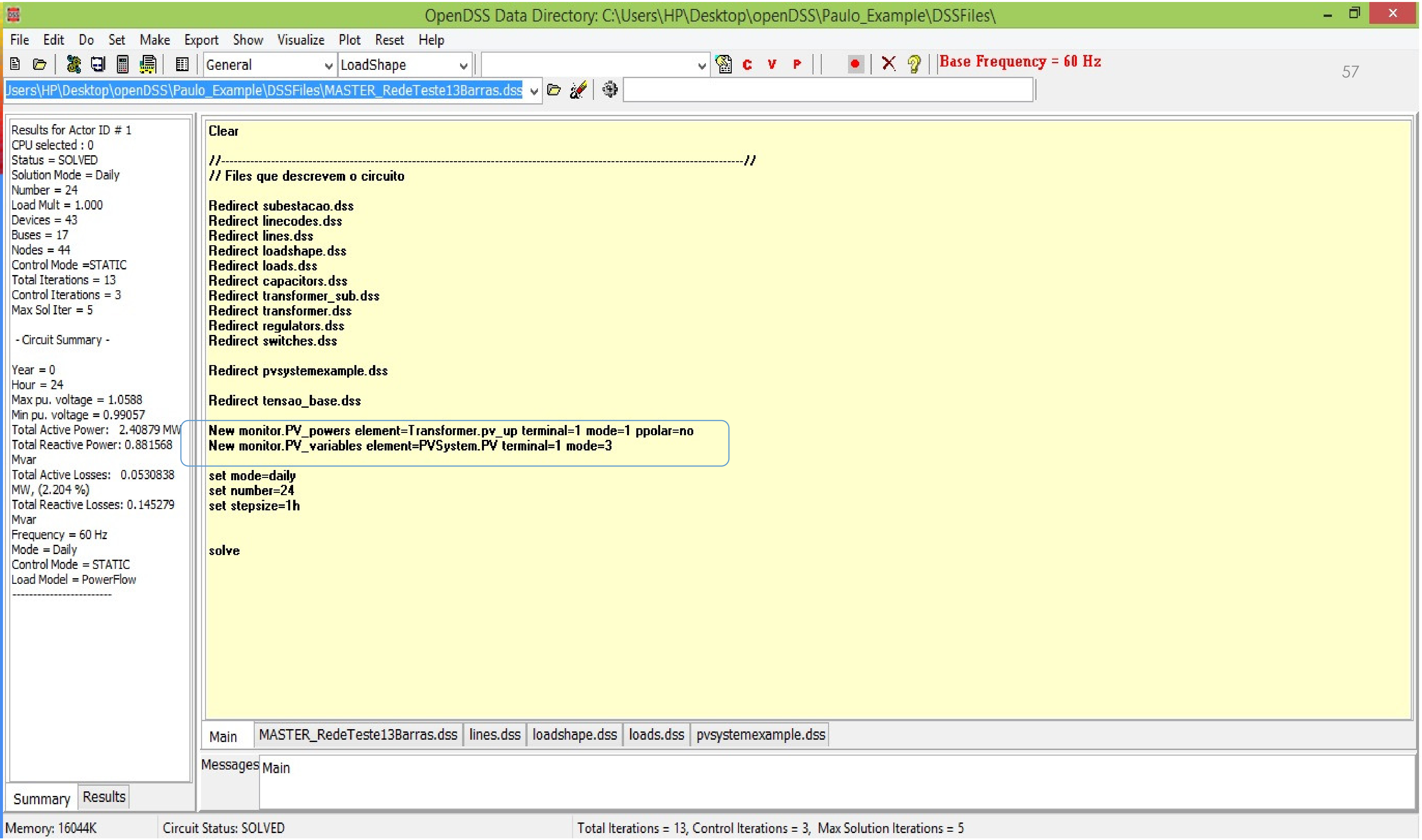
Redirect tensao_base.dss

New monitor.PV_powers element=Transformer.pv_up terminal=1 mode=1 ppolar=no

set mode=daily
set number=24
set stepsize=1h


solve
```

Memory: 16000K | Circuit Status: SOLVED | Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
General
LoadShape
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
Messages
Summary
Results

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 43
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//--------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

Redirect tensao_base.dss

New monitor.PV_powers element=Transformer.pv_up terminal=1 mode=1 ppolar=no
New monitor.PV_variables element=PVSystem.PV terminal=1 mode=3

set mode=daily
set number=24
set stepsize=1h

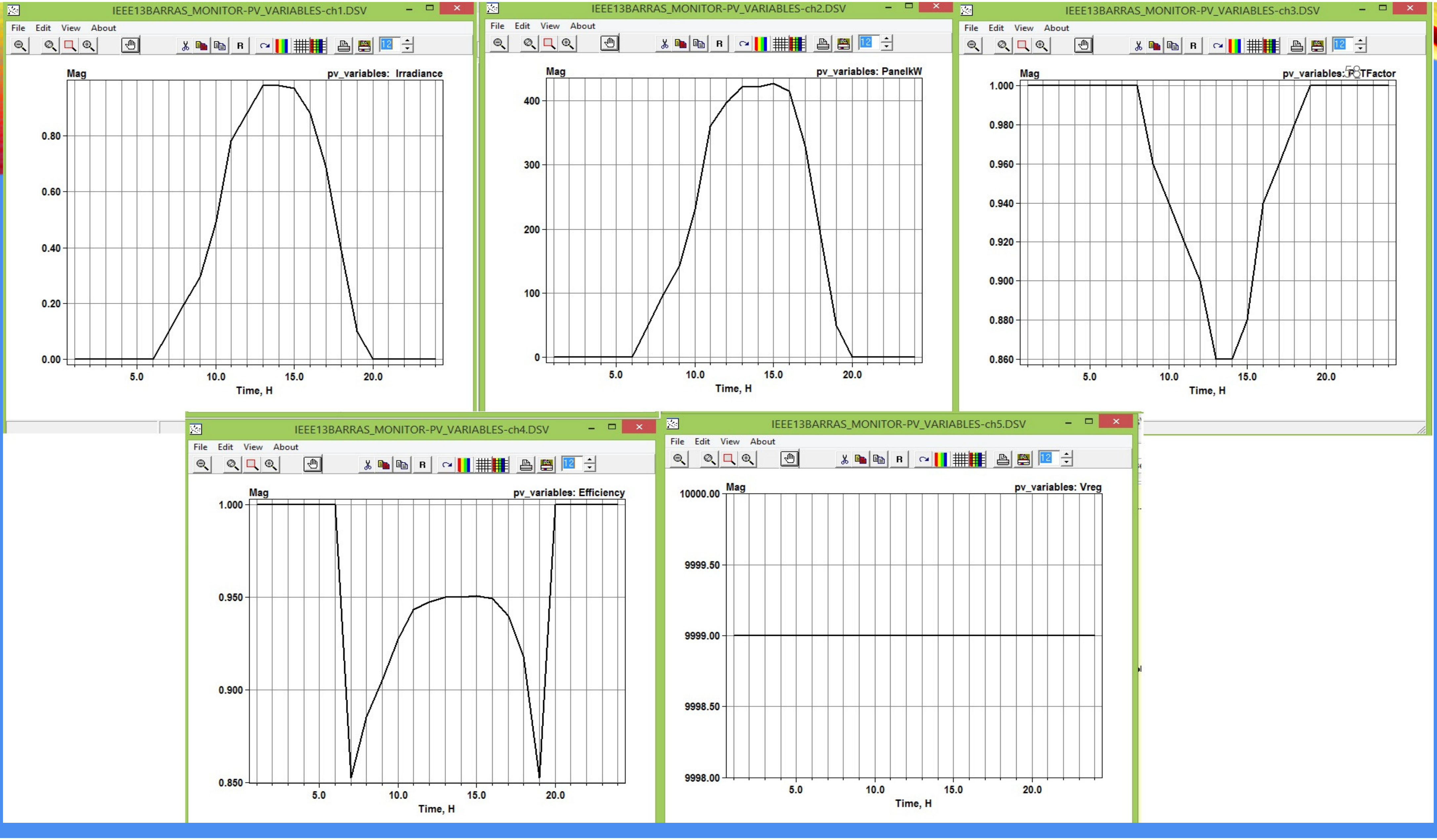

solve
```

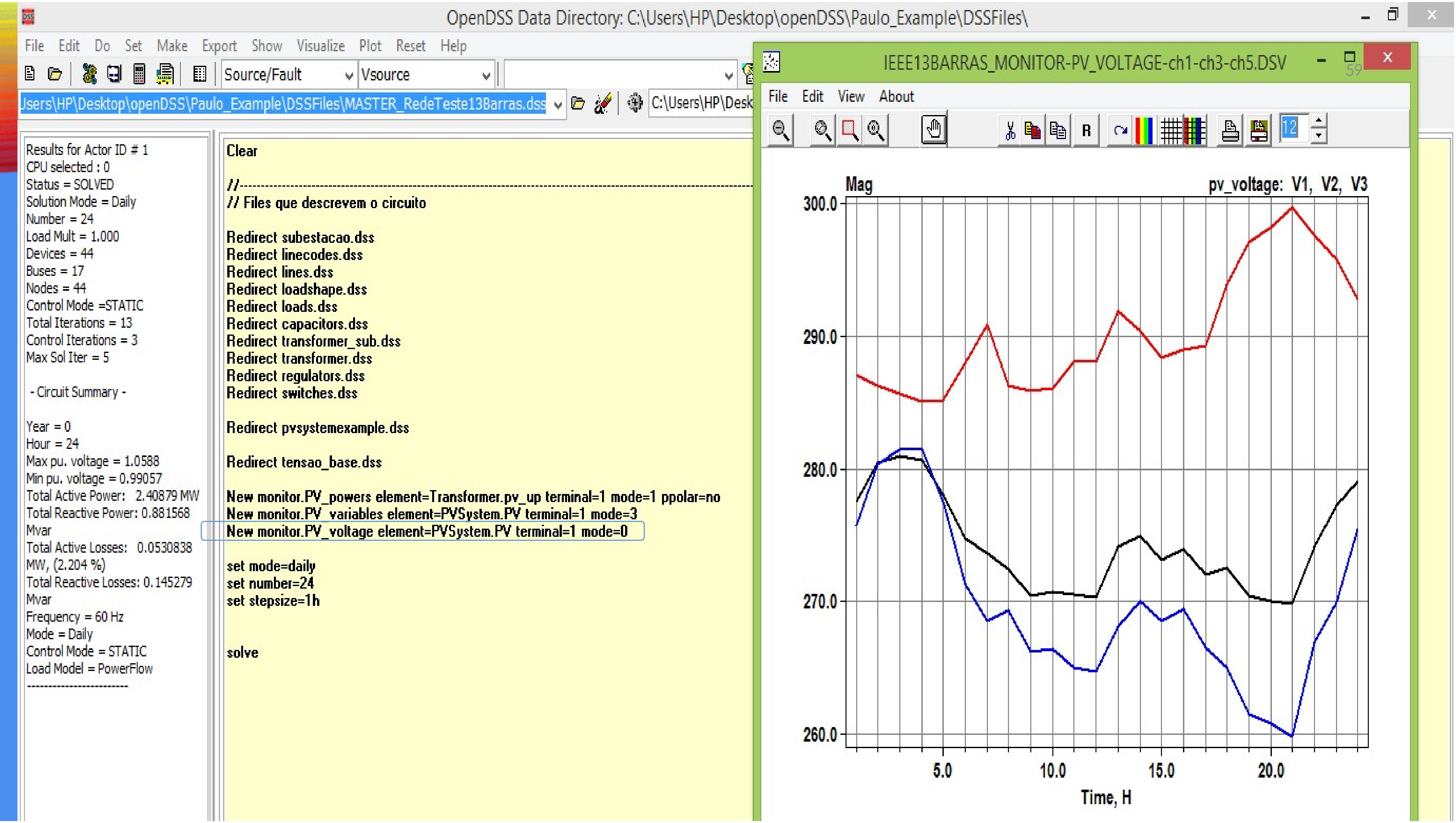
Messages Main

Memory: 16044K

Circuit Status: SOLVED

Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5


IEEE13BARRAS_MONITOR-PV_VARIABLES-ch1.DSV
File Edit View About
Mag
pv_variables: Irradiance
0.80
0.60
0.40
0.20
0.00
5.0
10.0
15.0
20.0
Time, H
IEEE13BARRAS_MONITOR-PV_VARIABLES-ch2.DSV
File Edit View About
Mag
pv_variables: PanelkW
400
300
200
100
0
5.0
10.0
15.0
20.0
Time, H
IEEE13BARRAS_MONITOR-PV_VARIABLES-ch3.DSV
File Edit View About
Mag
pv_variables: P_TFactor
1.000
0.980
0.960
0.940
0.920
0.900
0.880
0.860
5.0
10.0
15.0
20.0
Time, H
IEEE13BARRAS_MONITOR-PV_VARIABLES-ch4.DSV
File Edit View About
Mag
pv_variables: Efficiency
1.000
0.950
0.900
0.850
5.0
10.0
15.0
20.0
Time, H
IEEE13BARRAS_MONITOR-PV_VARIABLES-ch5.DSV
File Edit View About
Mag
pv_variables: Vreg
10000.00
9999.50
9999.00
9998.50
9998.00
5.0
10.0
15.0
20.0
Time, H


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desk
IEEE13BARRAS_MONITOR-PV_VOLTAGE-ch1-ch3-ch5.DSV
File Edit View About
12
Mag
pv_voltage: V1, V2, V3
300.0
290.0
280.0
270.0
260.0
5.0
10.0
15.0
20.0
Time, H

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 44
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//------------------------------------------------------------------------------------------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss

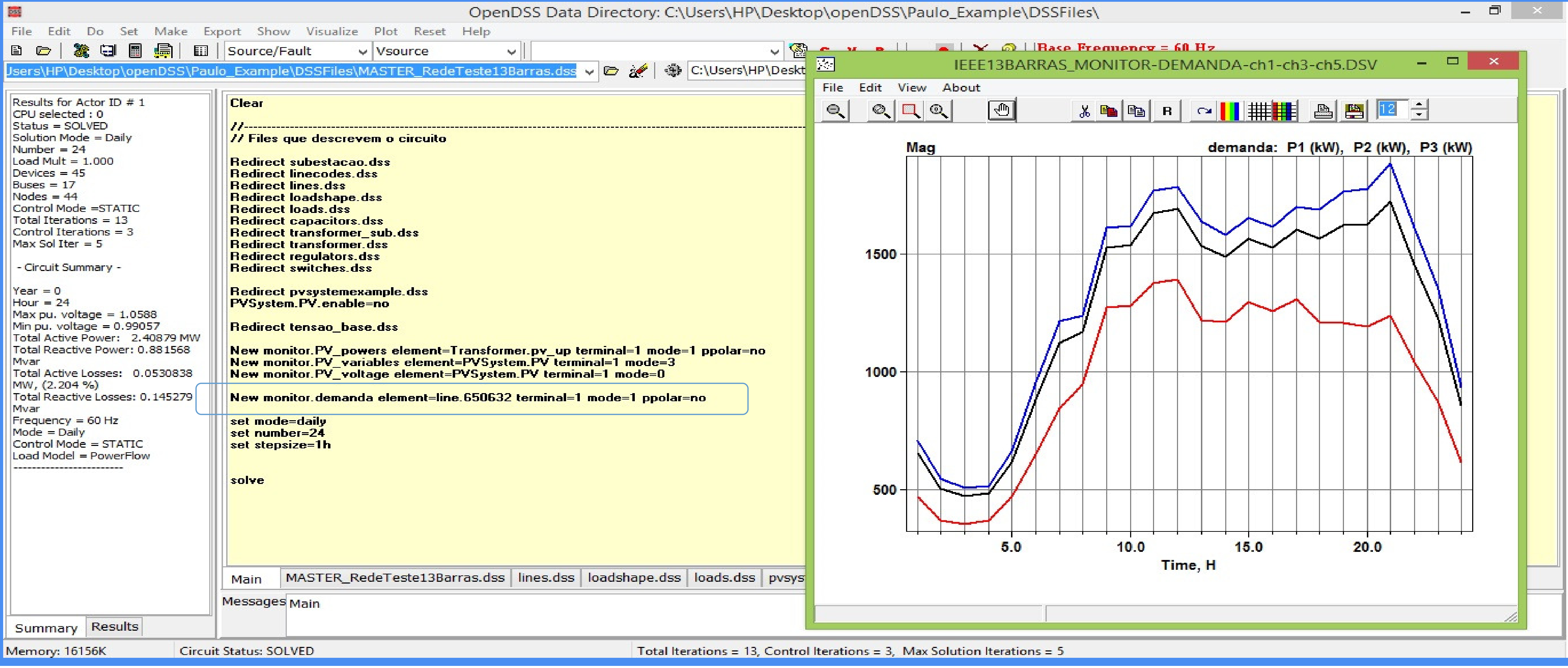
Redirect tensao_base.dss

New monitor.PV_powers element=Transformer.pv_up terminal=1 mode=1 ppolar=no
New monitor.PV_variables element=PVSystem.PV terminal=1 mode=3
New monitor.PV_voltage element=PVSystem.PV terminal=1 mode=0

set mode=daily
set number=24
set stepsize=1h


solve
```

PV SYSTEM COMPARANDO A DEMANDA


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Deskt
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsys
Messages
Main
Summary
Results
IEEE13BARRAS_MONITOR-DEMANDA-ch1-ch3-ch5.DSV
File Edit View About
Mag
demanda: P1 (kW), P2 (kW), P3 (kW)
1500
1000
500
5.0
10.0
15.0
20.0
Time, H

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
Clear

//------------------------------------------------------------------------------------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss
PVSystem.PV.enable=no

Redirect tensao_base.dss

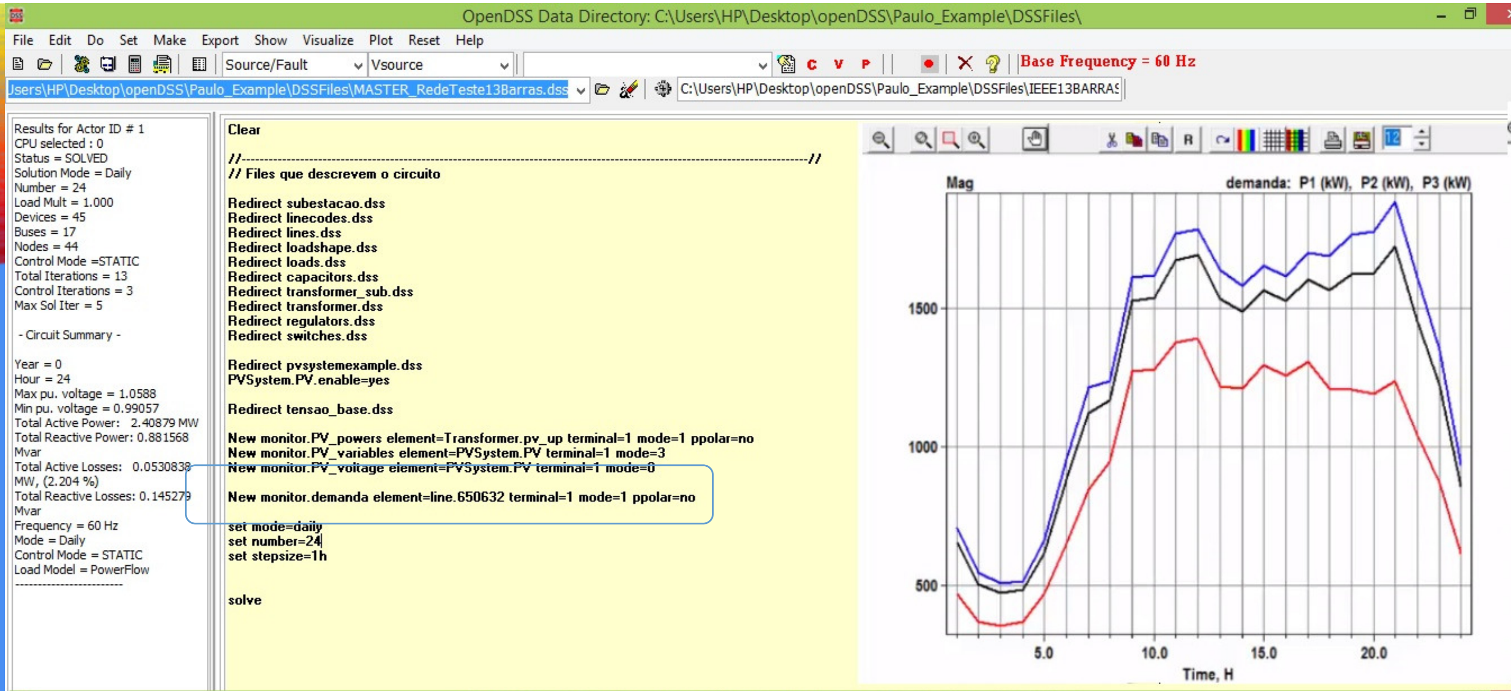
New monitor.PV_powers element=Transformer.pv_up terminal=1 mode=1 ppolar=no
New monitor.PV_variables element=PVSystem.PV terminal=1 mode=3
New monitor.PV_voltage element=PVSystem.PV terminal=1 mode=0

New monitor.demanda element=line.650632 terminal=1 mode=1 ppolar=no

set mode=daily
set number=24
set stepsize=1h


solve
```

```
Memory: 16156K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS
Mag
demanda: P1 (kW), P2 (kW), P3 (kW)
1500
1000
500
5.0
10.0
15.0
20.0
Time, H

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
-----------------------
```

```
Clear

//------------------------------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

Redirect pvsystemexample.dss
PVSystem.PV.enable=yes

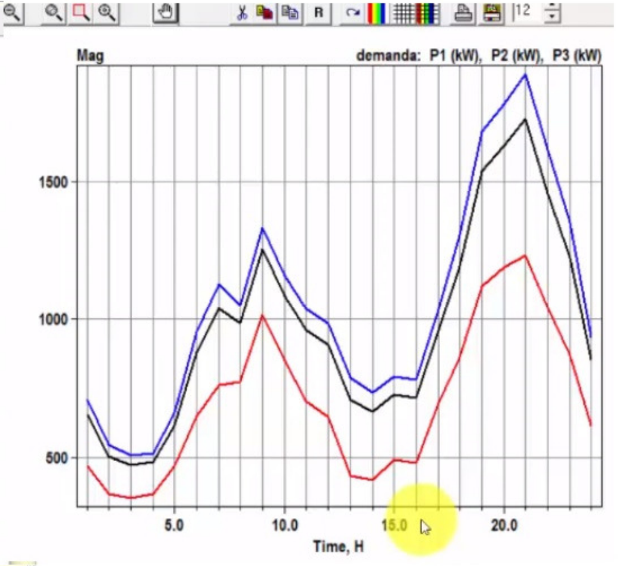
Redirect tensao_base.dss

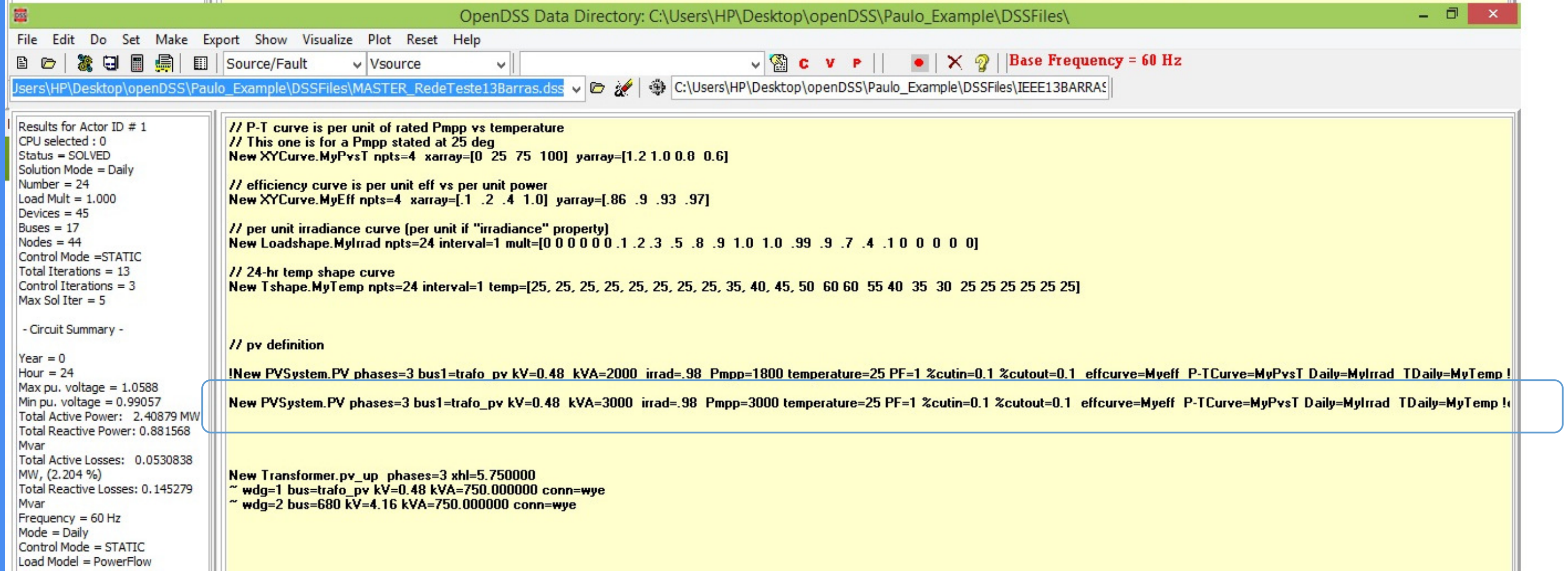
New monitor.PV_powers element=Transformer.pv_up terminal=1 mode=1 ppolar=no
New monitor.PV_variables element=PVSystem.PV terminal=1 mode=3
New monitor.PV_voltage element=PVSystem.PV terminal=1 mode=0

New monitor.demanda element=line.650632 terminal=1 mode=1 ppolar=no

set mode=daily
set number=24
set stepsize=1h


solve
```




OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\IEEE13BARRAS

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
```

```
// P-T curve is per unit of rated Pmpp vs temperature
// This one is for a Pmpp stated at 25 deg
New XYCurve.MyPvsT npts=4  xarray=[0  25  75  100]  yarray=[1.2 1.0 0.8  0.6]

// efficiency curve is per unit eff vs per unit power
New XYCurve.MyEff npts=4  xarray=[.1  .2  .4  1.0]  yarray=[.86  .9  .93  .97]

// per unit irradiance curve (per unit if "irradiance" property)
New Loadshape.MyIrrad npts=24 interval=1 mult=[0 0 0 0 0 0 .1 .2 .3  .5  .8  .9  1.0  1.0  .99  .9  .7  .4  .1 0  0  0  0  0]

// 24-hr temp shape curve
New Tshape.MyTemp npts=24 interval=1 temp=[25, 25, 25, 25, 25, 25, 25, 25, 35, 40, 45, 50  60 60  55 40  35  30  25 25 25 25 25 25]



// pv definition

!New PVSystem.PV phases=3 bus1=trafo_pv kV=0.48  kVA=2000  irrad=.98  Pmpp=1800 temperature=25 PF=1 %cutin=0.1 %cutout=0.1  effcurve=Myeff  P-TCurve=MyPvsT Daily=MyIrrad  TDaily=MyTemp !

New PVSystem.PV phases=3 bus1=trafo_pv kV=0.48  kVA=3000  irrad=.98  Pmpp=3000 temperature=25 PF=1 %cutin=0.1 %cutout=0.1  effcurve=Myeff  P-TCurve=MyPvsT Daily=MyIrrad  TDaily=MyTemp !



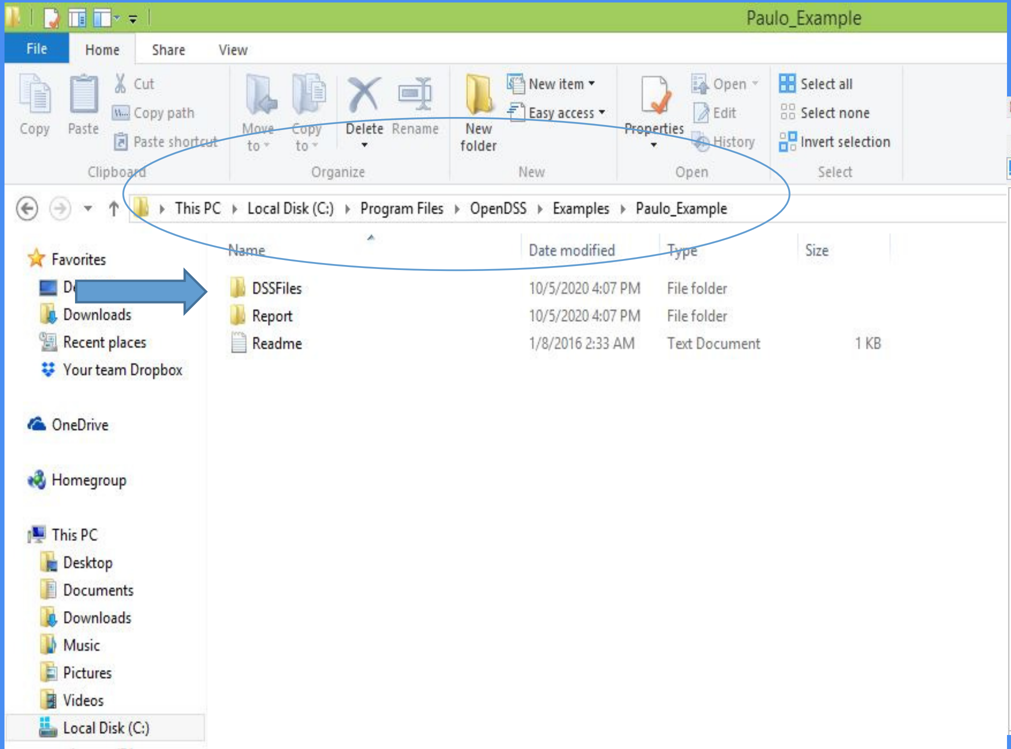
New Transformer.pv_up  phases=3 xhl=5.750000
~ wdg=1 bus=trafo_pv kV=0.48 kVA=750.000000 conn=wye
~ wdg=2 bus=680 kV=4.16 kVA=750.000000 conn=wye
```

photovoltaic system (Exemplo para a aula)

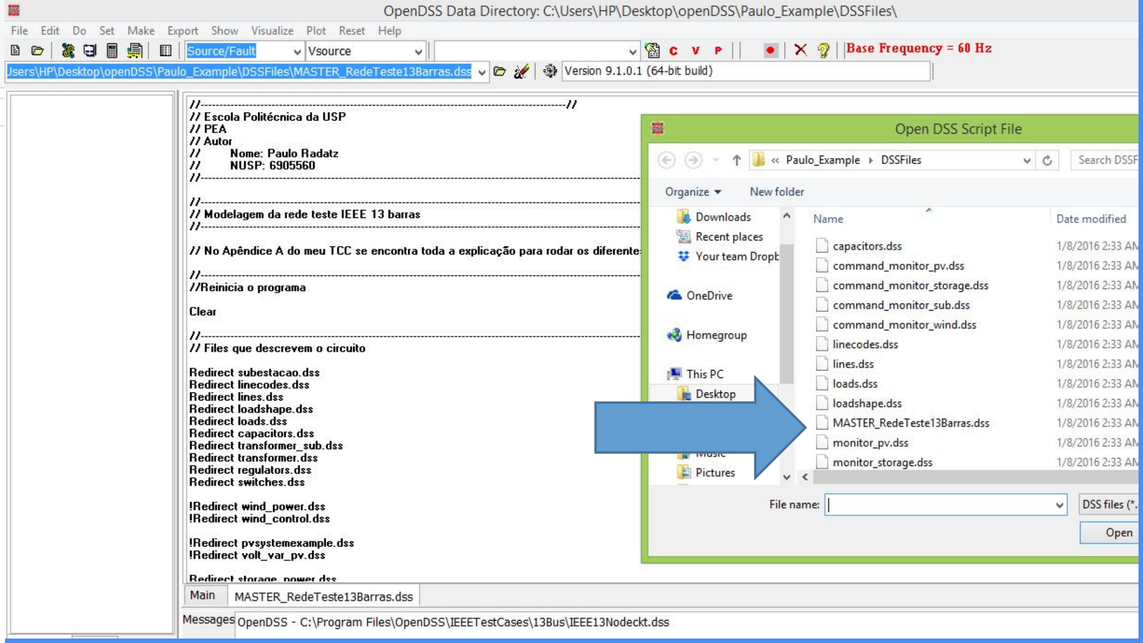
Carlos Frederico Meschini Almeida
cfmalmeida@usp.br
11 987822361

ASSESSING THE .DSS FILES OF THESES

- Open the following file from Paulo_Example: MASTER_RedeTeste13Barras.dss


Paulo_Example
File
Home
Share
View
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New item
Easy access
New folder
New
Properties
Open
Edit
History
Open
Select all
Select none
Invert selection
Select
This PC
Local Disk (C:)
Program Files
OpenDSS
Examples
Paulo_Example
Favorites
Downloads
Recent places
Your team Dropbox
OneDrive
Homegroup
This PC
Desktop
Documents
Downloads
Music
Pictures
Videos
Local Disk (C:)

Name	Date modified	Type	Size
DSSFiles	10/5/2020 4:07 PM	File folder	
Report	10/5/2020 4:07 PM	File folder	
Readme	1/8/2016 2:33 AM	Text Document	1 KB


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
Base Frequency = 60 Hz
Open DSS Script File
Paulo_Example
DSSFiles
Search DSSF
Organize
New folder
Downloads
Recent places
Your team Dropb
OneDrive
Homegroup
This PC
Desktop
Pictures
File name:
DSS files (*.
Open

Jsers\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss

Version 9.1.0.1 (64-bit build)

```
//-------------------------------------------------------------------------------------------//
// Escola Politécnica da USP
// PEA
// Autor
//       Nome: Paulo Radatz
//       NUSP: 6905560
//-------------------------------------------------------------------------------

//-------------------------------------------------------------------------------
// Modelagem da rede teste IEEE 13 barras
//-------------------------------------------------------------------------------

// No Apêndice A do meu TCC se encontra toda a explicação para rodar os diferente

//-------------------------------------------------------------------------------
//Reinicia o programa

Clear

//-------------------------------------------------------------------------------
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

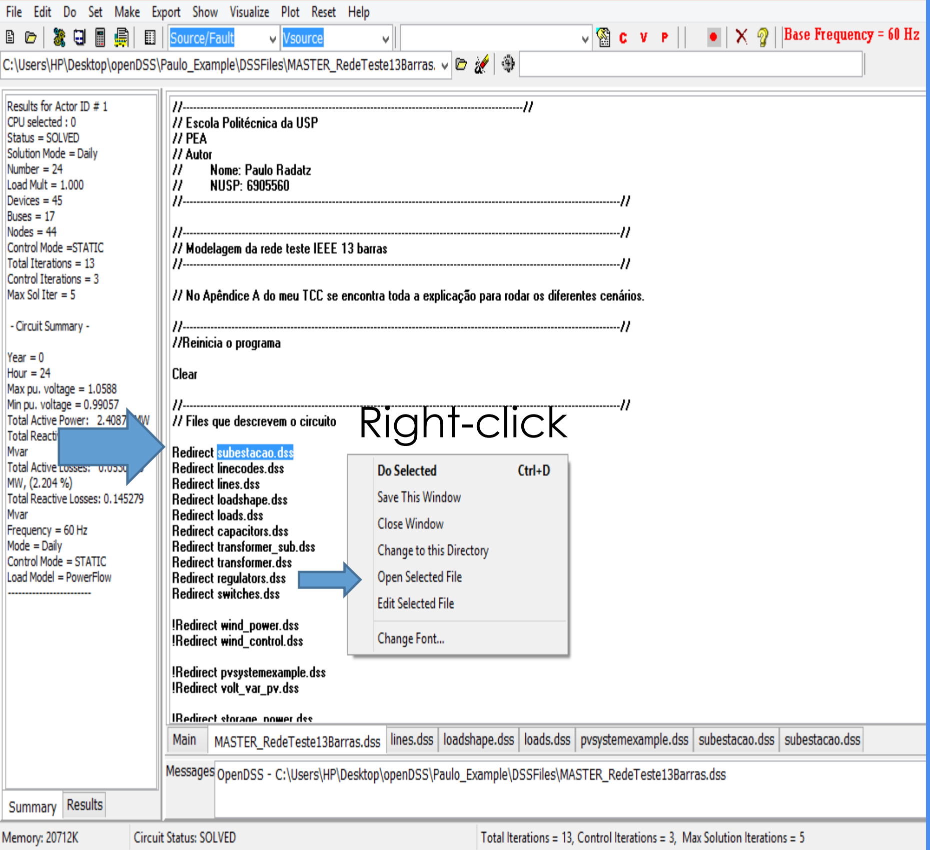
Redirect storage_power.dss
```

Main | MASTER_RedeTeste13Barras.dss

Messages: OpenDSS - C:\Program Files\OpenDSS\IEEETestCases\13Bus\IEEE13Nodeckt.dss

Name	Date modified
capacitors.dss	1/8/2016 2:33 AM
command_monitor_pv.dss	1/8/2016 2:33 AM
command_monitor_storage.dss	1/8/2016 2:33 AM
command_monitor_sub.dss	1/8/2016 2:33 AM
command_monitor_wind.dss	1/8/2016 2:33 AM
linecodes.dss	1/8/2016 2:33 AM
lines.dss	1/8/2016 2:33 AM
loads.dss	1/8/2016 2:33 AM
loadshape.dss	1/8/2016 2:33 AM
MASTER_RedeTeste13Barras.dss	1/8/2016 2:33 AM
monitor_pv.dss	1/8/2016 2:33 AM
monitor_storage.dss	1/8/2016 2:33 AM

SUBSTATIONS


File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
subestacao.dss
subestacao.dss
Summary
Results
Do Selected Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...

Right-click

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.4087 MW
Total Reacti
Mvar
Total Active Losses:
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
----------------------
```

```
//-----------------------------------------------------------------------------------//
// Escola Politécnica da USP
// PEA
// Autor
//        Nome: Paulo Radatz
//        NUSP: 6905560
//---------------------------------------------------------------------------------------------------//

//---------------------------------------------------------------------------------------------------//
// Modelagem da rede teste IEEE 13 barras
//---------------------------------------------------------------------------------------------------//

// No Apêndice A do meu TCC se encontra toda a explicação para rodar os diferentes cenários.

//---------------------------------------------------------------------------------------------------//
//Reinicia o programa

Clear

//---------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

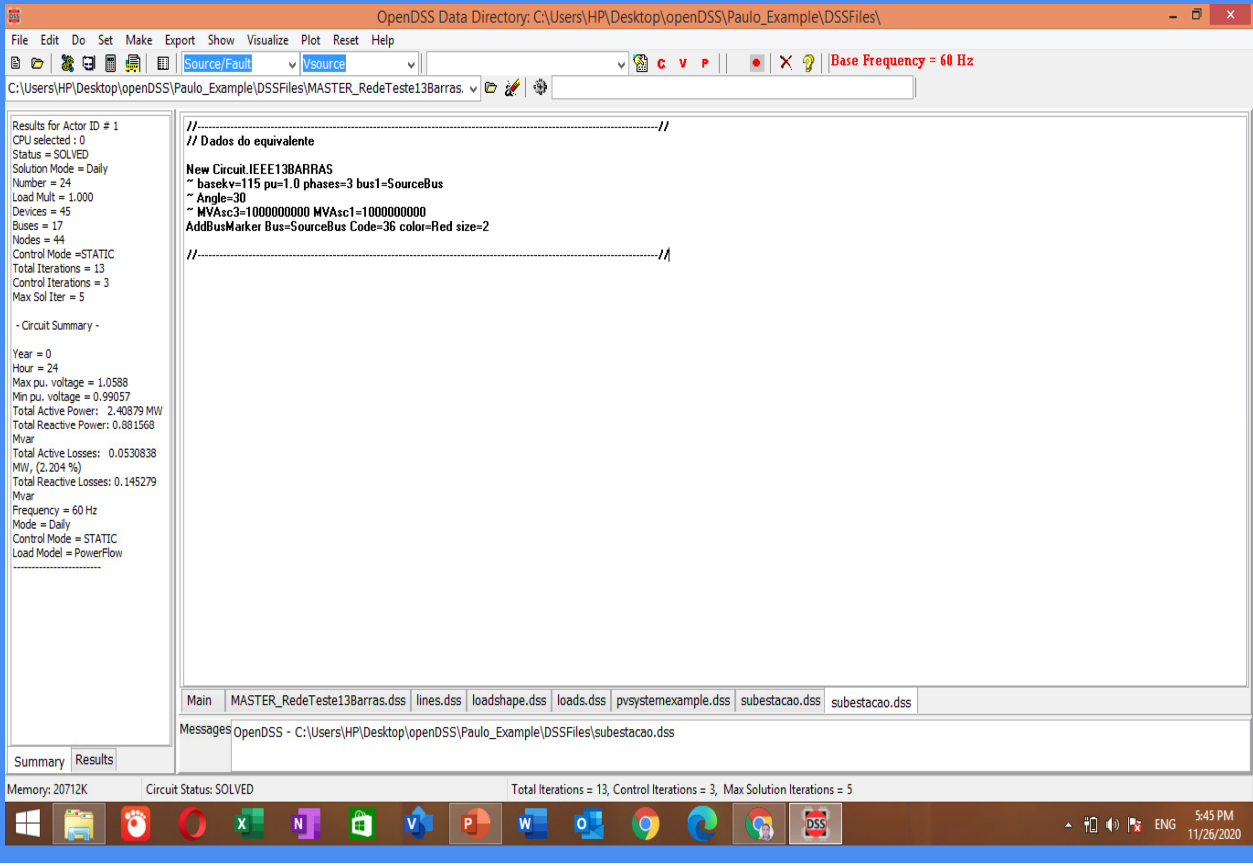
!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

!Redirect storage_power.dss
```

```
Messages OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
```

```
Memory: 20712K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```


OpenDSS Data Directory: C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\
File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
subestacao.dss
subestacao.dss
Summary
Results
ENG
5:45 PM
11/26/2020

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
----------------------
```

```
//---------------------------------------------------------------------------------------------------//
// Dados do equivalente

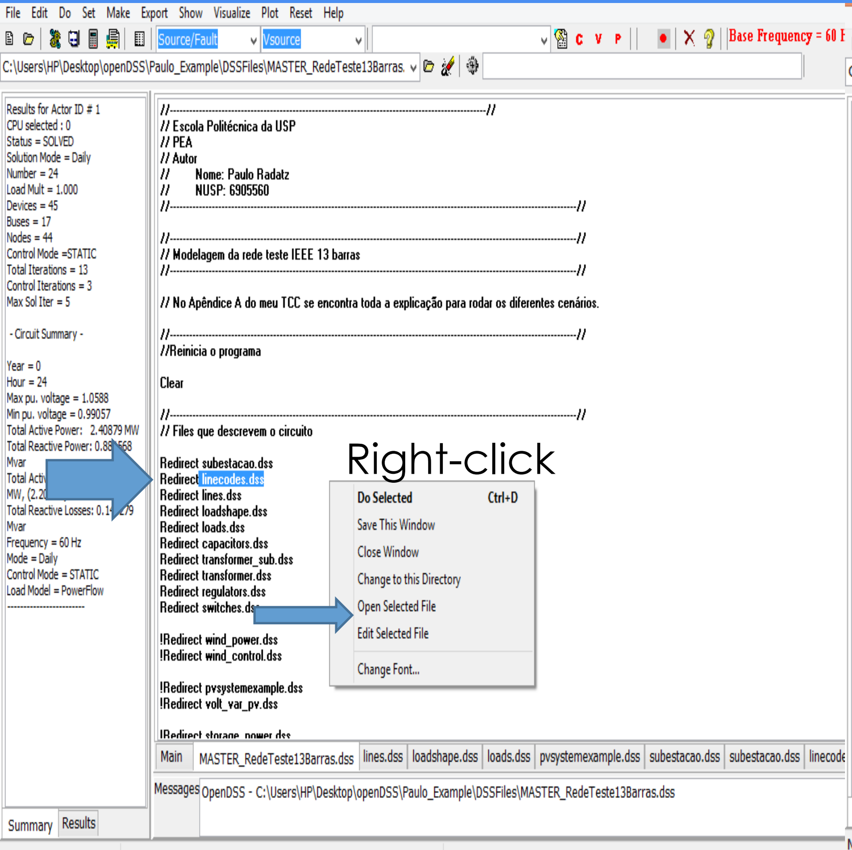
New Circuit.IEEE13BARRAS
~ basekv=115 pu=1.0 phases=3 bus1=SourceBus
~ Angle=30
~ MVAsc3=1000000000 MVAsc1=1000000000
AddBusMarker Bus=SourceBus Code=36 color=Red size=2

//---------------------------------------------------------------------------------------------------//
```

```
Messages OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\subestacao.dss
```

```
Memory: 20712K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

LINE CODES


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 H
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
subestacao.dss
subestacao.dss
linecode
Messages
Summary
Results
Do Selected
Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...

Right-click

```
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
```

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.88 568
Mvar
Total Acti
MW, (2.20
Total Reactive Losses: 0.14 279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//-------------------------------------------------------------------------------//
// Escola Politécnica da USP
// PEA
// Autor
//      Nome: Paulo Radatz
//      NUSP: 6905560
//--------------------------------------------------------------------------------------------------//

//--------------------------------------------------------------------------------------------------//
// Modelagem da rede teste IEEE 13 barras
//--------------------------------------------------------------------------------------------------//

// No Apêndice A do meu TCC se encontra toda a explicação para rodar os diferentes cenários.

//--------------------------------------------------------------------------------------------------//
//Reinicia o programa

Clear

//--------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.ds

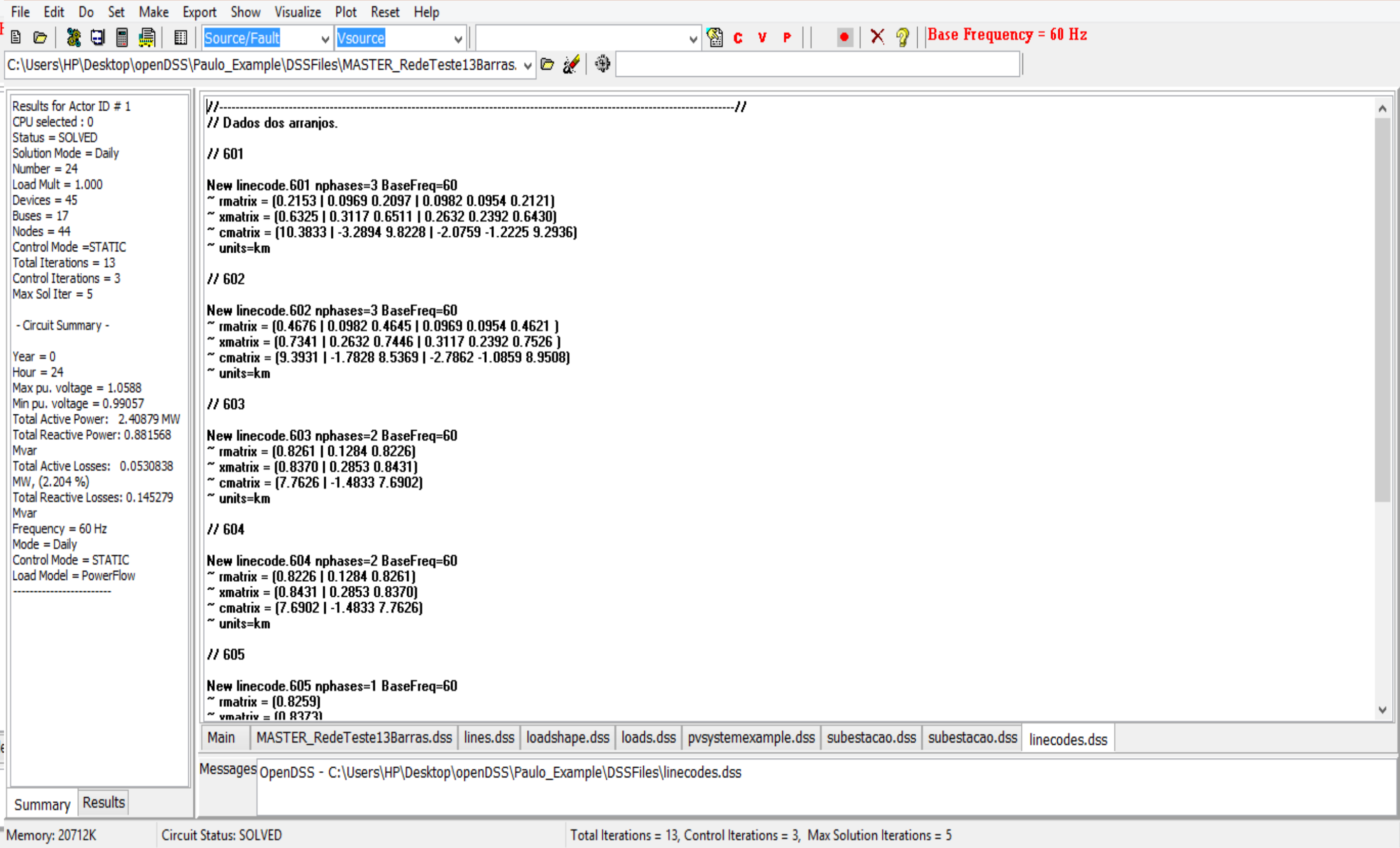
!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

!Redirect storage_power.dss
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss
```

```
Memory: 20712K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
subestacao.dss
subestacao.dss
linecodes.dss
Messages
Summary
Results

```
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
```

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//--------------------------------------------------------------------------------------------------------------------//
// Dados dos arranjos.

// 601

New linecode.601 nphases=3 BaseFreq=60
~ rmatrix = (0.2153 | 0.0969 0.2097 | 0.0982 0.0954 0.2121)
~ xmatrix = (0.6325 | 0.3117 0.6511 | 0.2632 0.2392 0.6430)
~ cmatrix = (10.3833 | -3.2894 9.8228 | -2.0759 -1.2225 9.2936)
~ units=km

// 602

New linecode.602 nphases=3 BaseFreq=60
~ rmatrix = (0.4676 | 0.0982 0.4645 | 0.0969 0.0954 0.4621 )
~ xmatrix = (0.7341 | 0.2632 0.7446 | 0.3117 0.2392 0.7526 )
~ cmatrix = (9.3931 | -1.7828 8.5369 | -2.7862 -1.0859 8.9508)
~ units=km

// 603

New linecode.603 nphases=2 BaseFreq=60
~ rmatrix = (0.8261 | 0.1284 0.8226)
~ xmatrix = (0.8370 | 0.2853 0.8431)
~ cmatrix = (7.7626 | -1.4833 7.6902)
~ units=km

// 604

New linecode.604 nphases=2 BaseFreq=60
~ rmatrix = (0.8226 | 0.1284 0.8261)
~ xmatrix = (0.8431 | 0.2853 0.8370)
~ cmatrix = (7.6902 | -1.4833 7.7626)
~ units=km

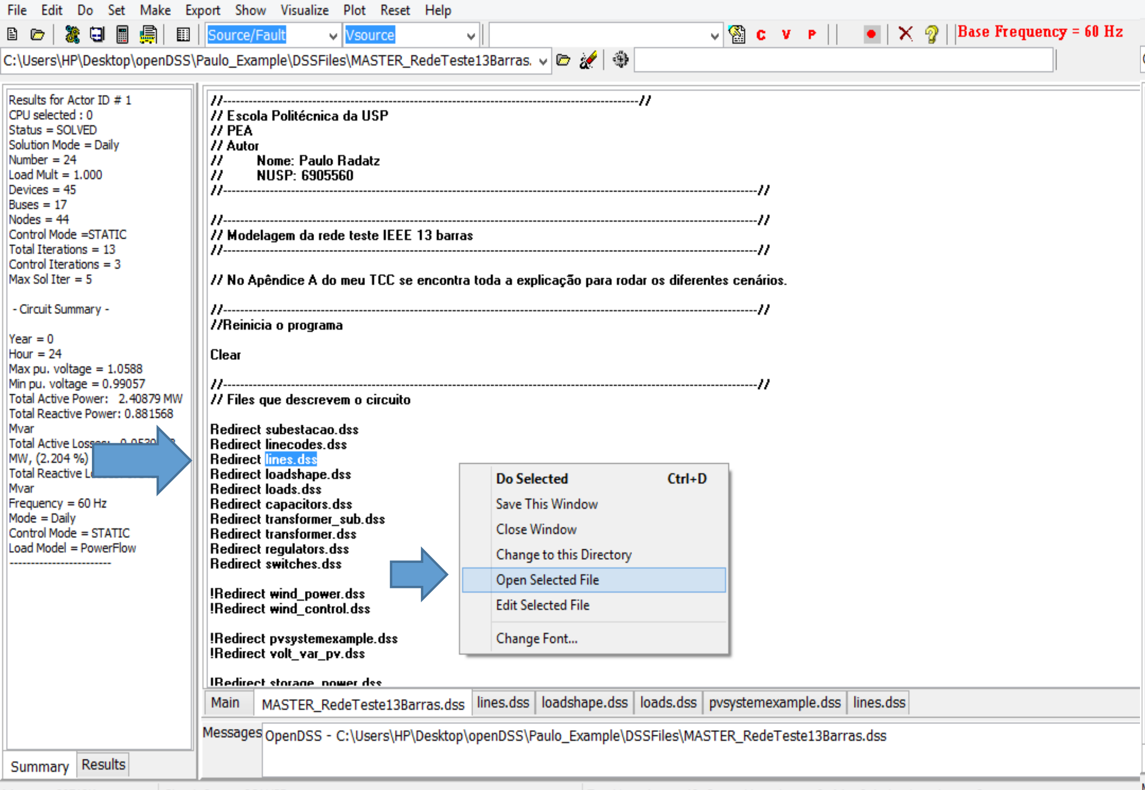
// 605

New linecode.605 nphases=1 BaseFreq=60
~ rmatrix = (0.8259)
~ xmatrix = (0.8373)
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\linecodes.dss
```

```
Memory: 20712K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

LINES


File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
Do Selected Ctrl+D
Save This Window
Close Window
Change to this Directory
Open Selected File
Edit Selected File
Change Font...
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
lines.dss
Summary
Results

C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Loss
MW, (2.204 %)
Total Reactive L
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//------------------------------------------------------------------------------------------//
// Escola Politécnica da USP
// PEA
// Autor
//       Nome: Paulo Radatz
//       NUSP: 6905560
//----------------------------------------------------------------------------------------------------//

//----------------------------------------------------------------------------------------------------//
// Modelagem da rede teste IEEE 13 barras
//----------------------------------------------------------------------------------------------------//

// No Apêndice A do meu TCC se encontra toda a explicação para rodar os diferentes cenários.

//----------------------------------------------------------------------------------------------------//
//Reinicia o programa

Clear

//----------------------------------------------------------------------------------------------------//
// Files que descrevem o circuito

Redirect subestacao.dss
Redirect linecodes.dss
Redirect lines.dss
Redirect loadshape.dss
Redirect loads.dss
Redirect capacitors.dss
Redirect transformer_sub.dss
Redirect transformer.dss
Redirect regulators.dss
Redirect switches.dss

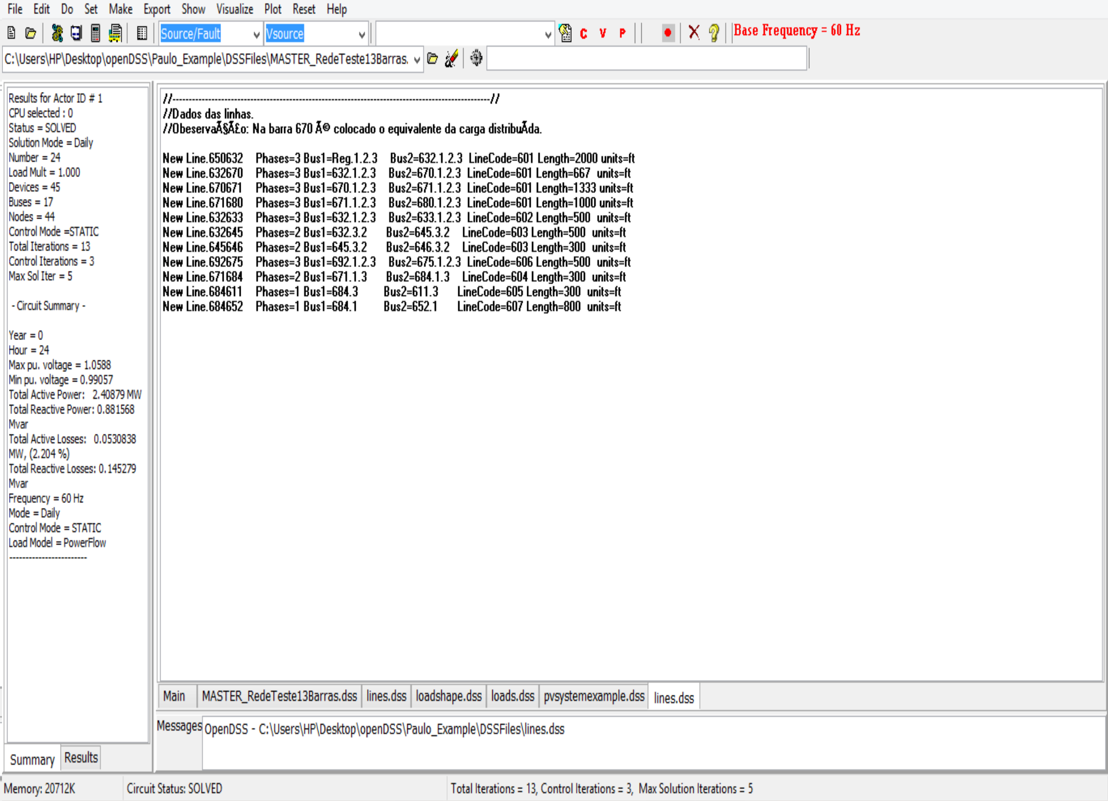
!Redirect wind_power.dss
!Redirect wind_control.dss

!Redirect pvsystemexample.dss
!Redirect volt_var_pv.dss

!Redirect storage_power.dss
```

Messages OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.dss

Memory: 20712K | Circuit Status: SOLVED | Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5


File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
lines.dss
Summary
Results

C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//------------------------------------------------------------------------------------------//
//Dados das linhas.
//ObeservaÃ§Ã£o: Na barra 670 Ã© colocado o equivalente da carga distribuÃda.

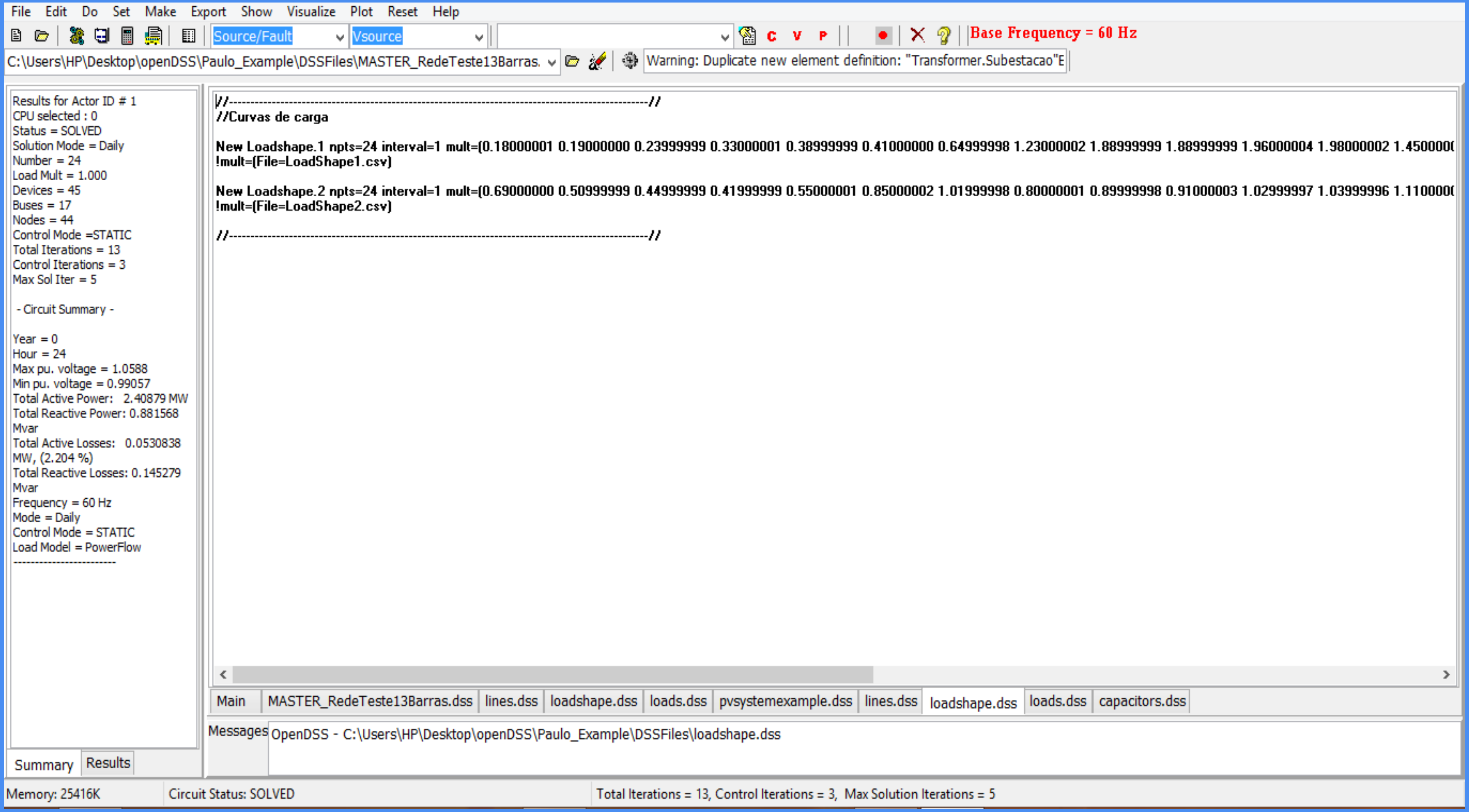
New Line.650632    Phases=3 Bus1=Reg.1.2.3    Bus2=632.1.2.3  LineCode=601 Length=2000 units=ft
New Line.632670    Phases=3 Bus1=632.1.2.3    Bus2=670.1.2.3  LineCode=601 Length=667  units=ft
New Line.670671    Phases=3 Bus1=670.1.2.3    Bus2=671.1.2.3  LineCode=601 Length=1333 units=ft
New Line.671680    Phases=3 Bus1=671.1.2.3    Bus2=680.1.2.3  LineCode=601 Length=1000 units=ft
New Line.632633    Phases=3 Bus1=632.1.2.3    Bus2=633.1.2.3  LineCode=602 Length=500  units=ft
New Line.632645    Phases=2 Bus1=632.3.2      Bus2=645.3.2    LineCode=603 Length=500  units=ft
New Line.645646    Phases=2 Bus1=645.3.2      Bus2=646.3.2    LineCode=603 Length=300  units=ft
New Line.692675    Phases=3 Bus1=692.1.2.3    Bus2=675.1.2.3  LineCode=606 Length=500  units=ft
New Line.671684    Phases=2 Bus1=671.1.3      Bus2=684.1.3    LineCode=604 Length=300  units=ft
New Line.684611    Phases=1 Bus1=684.3        Bus2=611.3      LineCode=605 Length=300  units=ft
New Line.684652    Phases=1 Bus1=684.1        Bus2=652.1      LineCode=607 Length=800  units=ft
```

Messages OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\lines.dss

Memory: 20712K | Circuit Status: SOLVED | Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5

- Perform the same action to see the following codes:
- Load shapes
- Loads
- Capacitors
- Transformer
- Regulators
- switches

LOAD SHAPES


File Edit Do Set Make Export Show Visualize Plot Reset Help
Source/Fault
Vsource
C V P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
lines.dss
loadshape.dss
loads.dss
capacitors.dss
Summary
Results
Messages

C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

Warning: Duplicate new element definition: "Transformer.Subestacao"E

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//------------------------------------------------------------------------------------------------//
//Curvas de carga

New Loadshape.1 npts=24 interval=1 mult=(0.18000001 0.19000000 0.23999999 0.33000001 0.38999999 0.41000000 0.64999998 1.23000002 1.88999999 1.88999999 1.96000004 1.98000002 1.450000
!mult=(File=LoadShape1.csv)

New Loadshape.2 npts=24 interval=1 mult=(0.69000000 0.50999999 0.44999999 0.41999999 0.55000001 0.85000002 1.01999998 0.80000001 0.89999998 0.91000003 1.02999997 1.03999996 1.110000
!mult=(File=LoadShape2.csv)

//------------------------------------------------------------------------------------------------//
```

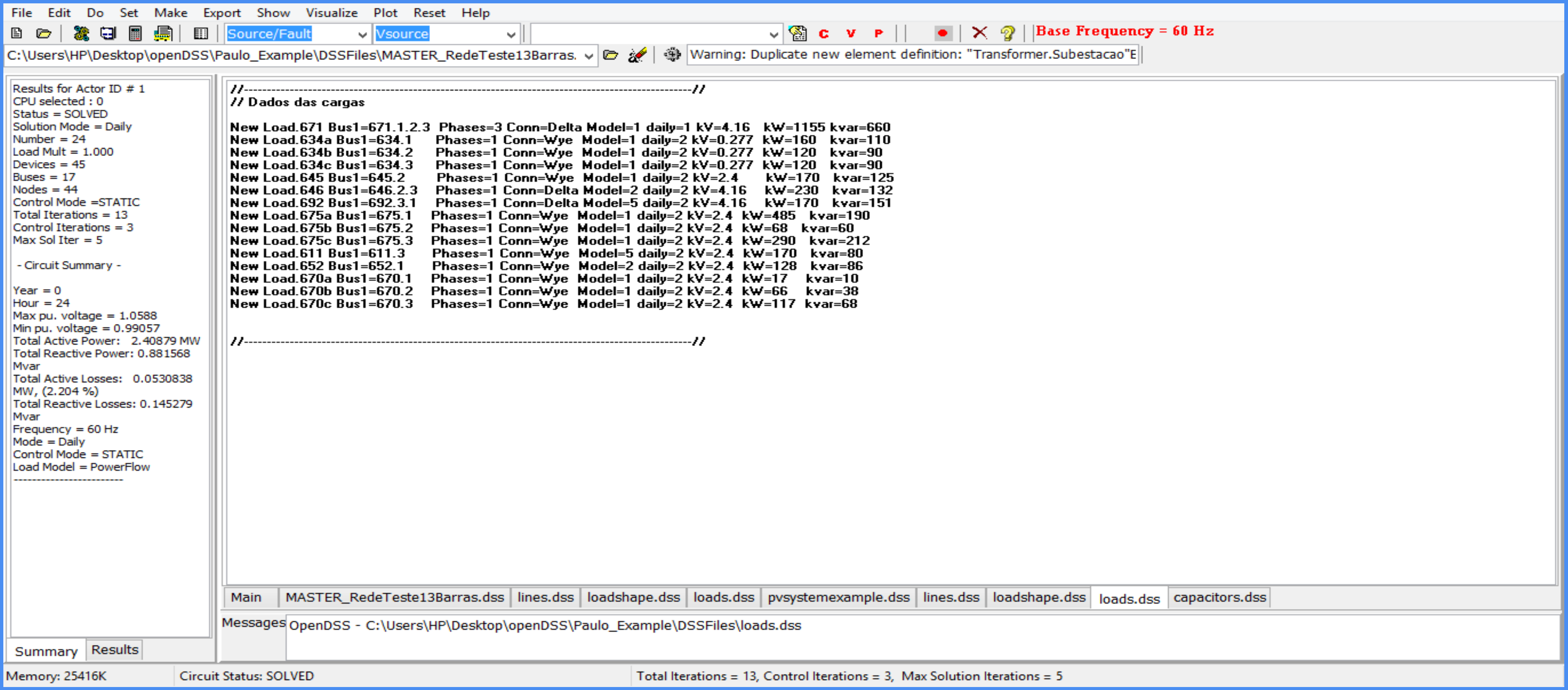
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\loadshape.dss

Memory: 25416K

Circuit Status: SOLVED

Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5

LOADS


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
lines.dss
loadshape.dss
loads.dss
capacitors.dss
Summary
Results
Messages

C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

Warning: Duplicate new element definition: "Transformer.Subestacao"E

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//------------------------------------------------------------------------------------------//
// Dados das cargas

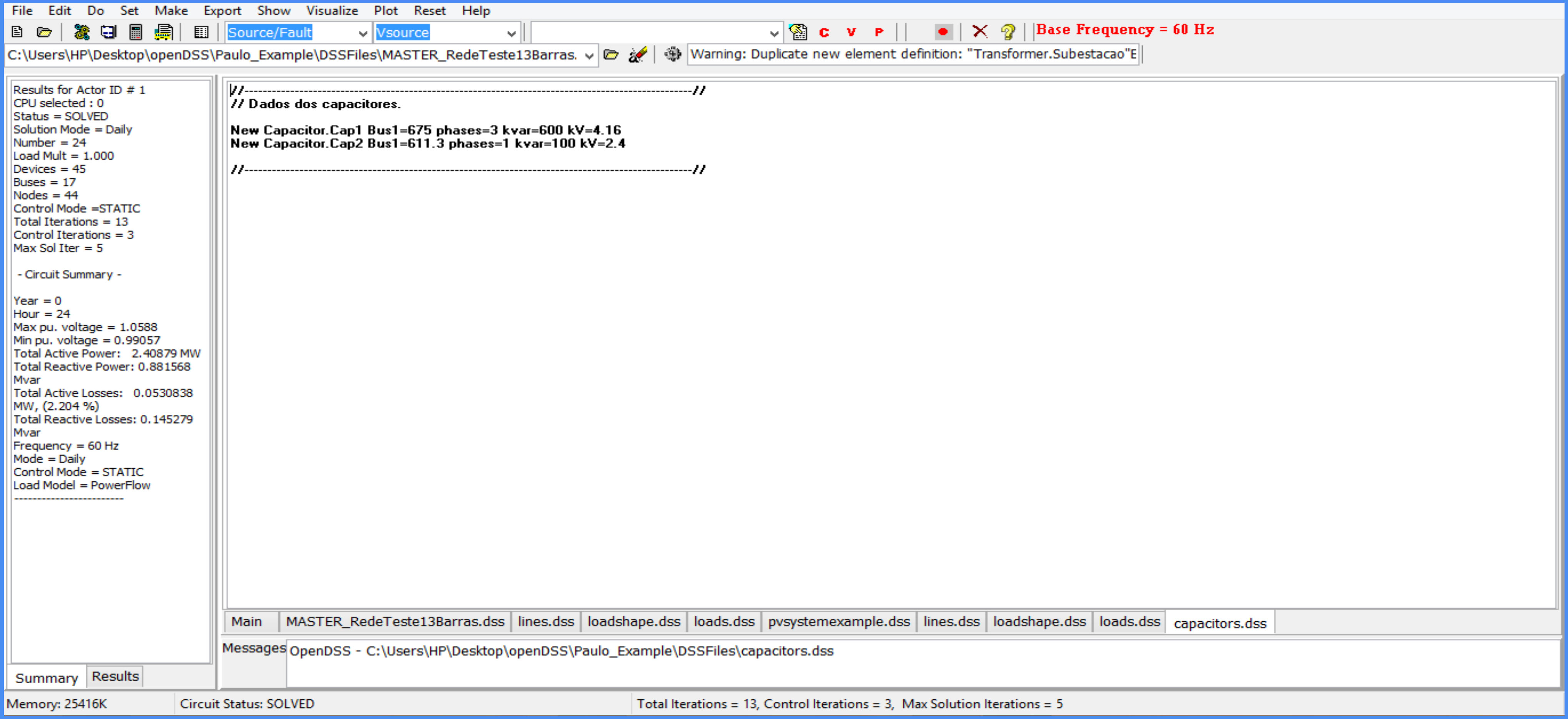
New Load.671 Bus1=671.1.2.3  Phases=3 Conn=Delta Model=1 daily=1 kV=4.16   kW=1155 kvar=660
New Load.634a Bus1=634.1     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=160   kvar=110
New Load.634b Bus1=634.2     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=120   kvar=90
New Load.634c Bus1=634.3     Phases=1 Conn=Wye  Model=1 daily=2 kV=0.277  kW=120   kvar=90
New Load.645 Bus1=645.2      Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4     kW=170   kvar=125
New Load.646 Bus1=646.2.3    Phases=1 Conn=Delta Model=2 daily=2 kV=4.16   kW=230   kvar=132
New Load.692 Bus1=692.3.1    Phases=1 Conn=Delta Model=5 daily=2 kV=4.16   kW=170   kvar=151
New Load.675a Bus1=675.1    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=485   kvar=190
New Load.675b Bus1=675.2    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=68   kvar=60
New Load.675c Bus1=675.3    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=290   kvar=212
New Load.611 Bus1=611.3     Phases=1 Conn=Wye  Model=5 daily=2 kV=2.4  kW=170   kvar=80
New Load.652 Bus1=652.1     Phases=1 Conn=Wye  Model=2 daily=2 kV=2.4  kW=128   kvar=86
New Load.670a Bus1=670.1    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=17    kvar=10
New Load.670b Bus1=670.2    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=66    kvar=38
New Load.670c Bus1=670.3    Phases=1 Conn=Wye  Model=1 daily=2 kV=2.4  kW=117  kvar=68


//------------------------------------------------------------------------------------------//
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\loads.dss
```

```
Memory: 25416K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

CAPACITORS


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
lines.dss
loadshape.dss
loads.dss
capacitors.dss
Summary
Results
Messages

C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

Warning: Duplicate new element definition: "Transformer.Subestacao"E

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
-----------------------
```

```
//------------------------------------------------------------------------------------------//
// Dados dos capacitores.

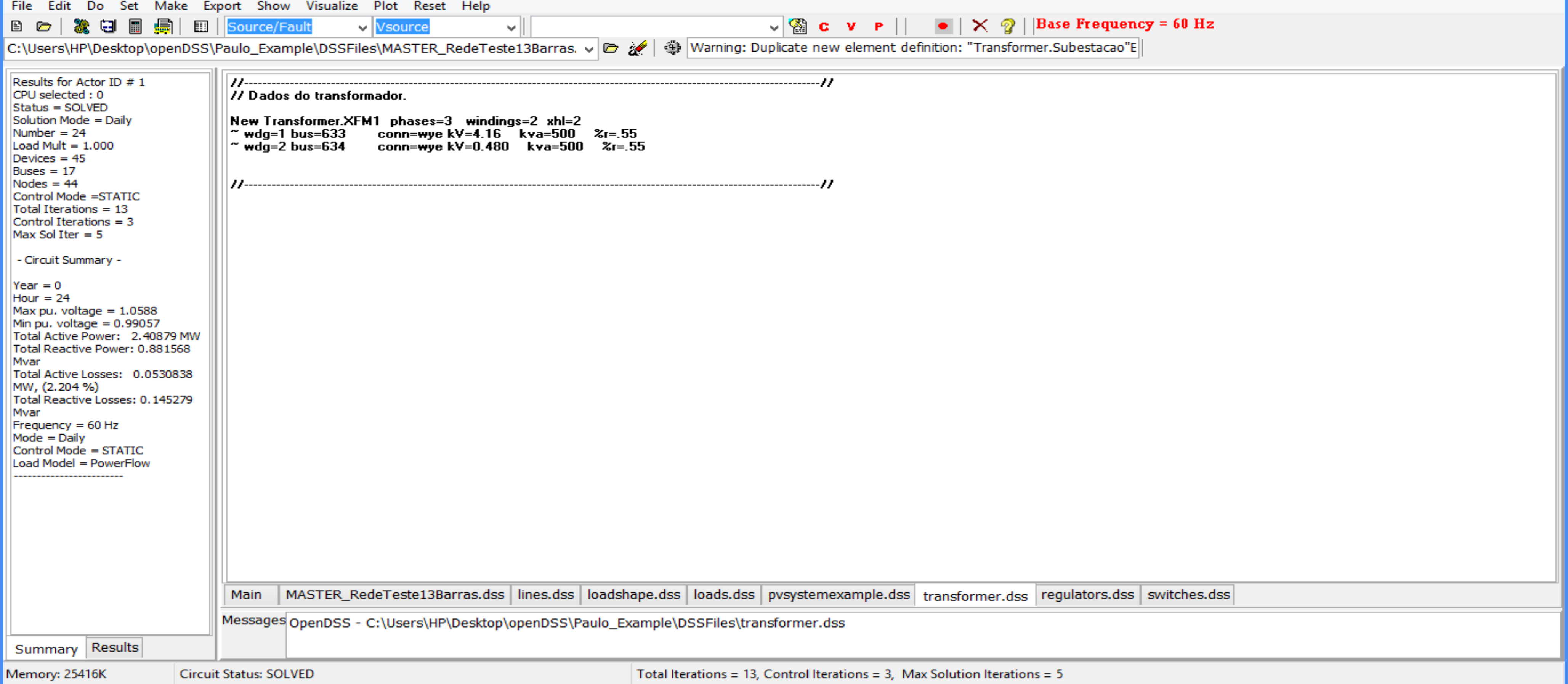
New Capacitor.Cap1 Bus1=675 phases=3 kvar=600 kV=4.16
New Capacitor.Cap2 Bus1=611.3 phases=1 kvar=100 kV=2.4

//------------------------------------------------------------------------------------------//
```

OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\capacitors.dss

Memory: 25416K
Circuit Status: SOLVED
Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5

TRANSFORMER


File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
transformer.dss
regulators.dss
switches.dss
Summary
Results
Messages

Warning: Duplicate new element definition: "Transformer.Subestacao"E

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//-------------------------------------------------------------------------------------------------------//
// Dados do transformador.

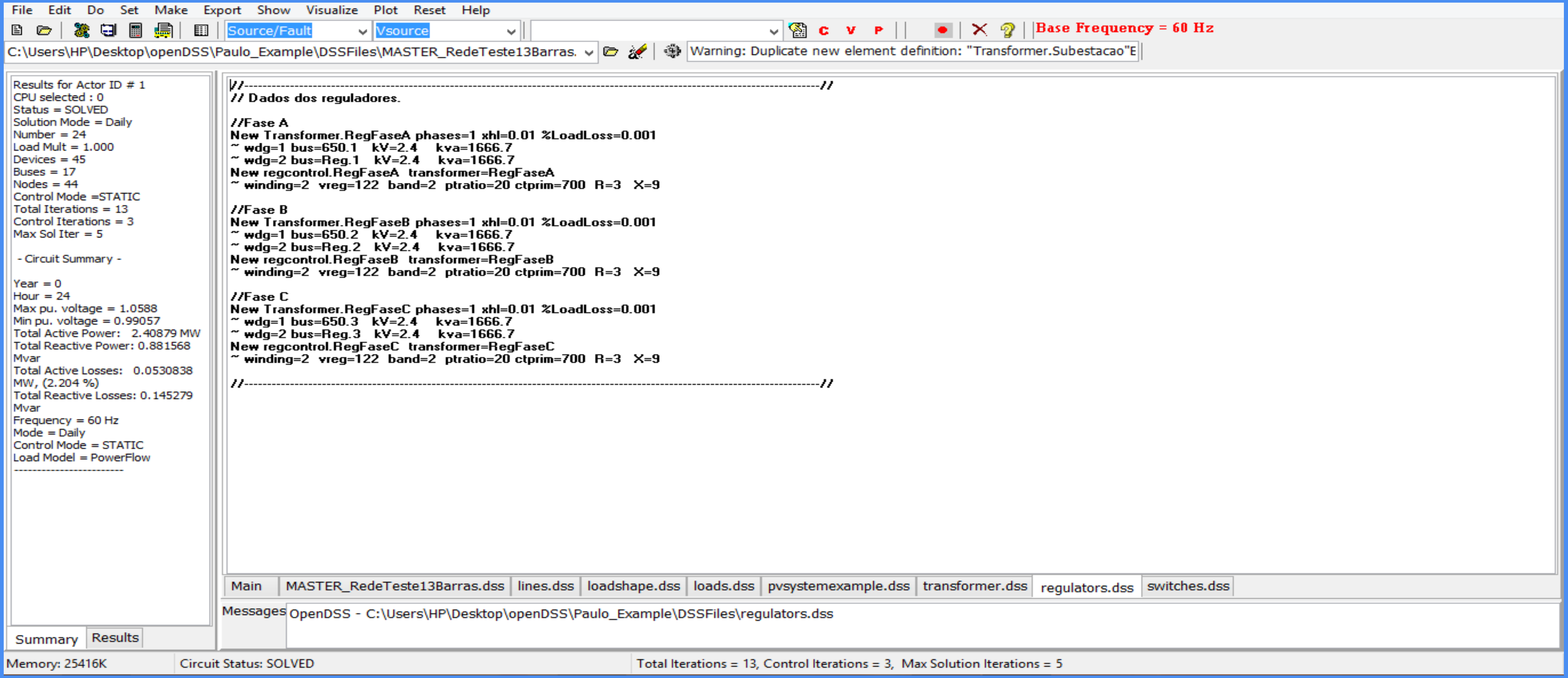
New Transformer.XFM1  phases=3   windings=2  xhl=2
~ wdg=1 bus=633       conn=wye kV=4.16    kva=500    %r=.55
~ wdg=2 bus=634       conn=wye kV=0.480    kva=500    %r=.55


//-------------------------------------------------------------------------------------------------------//
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\transformer.dss
```

```
Memory: 25416K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

REGULATORS



File
Edit
Do
Set
Make
Export
Show
Visualize
Plot
Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
transformer.dss
regulators.dss
switches.dss
Summary
Results
Messages

```
Warning: Duplicate new element definition: "Transformer.Subestacao"E
```

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//---------------------------------------------------------------------------------------------------//
// Dados dos reguladores.

//Fase A
New Transformer.RegFaseA phases=1 xhl=0.01 %LoadLoss=0.001
~ wdg=1 bus=650.1   kV=2.4    kva=1666.7
~ wdg=2 bus=Reg.1   kV=2.4    kva=1666.7
New regcontrol.RegFaseA  transformer=RegFaseA
~ winding=2  vreg=122  band=2  ptratio=20 ctprim=700  R=3   X=9

//Fase B
New Transformer.RegFaseB phases=1 xhl=0.01 %LoadLoss=0.001
~ wdg=1 bus=650.2   kV=2.4    kva=1666.7
~ wdg=2 bus=Reg.2   kV=2.4    kva=1666.7
New regcontrol.RegFaseB  transformer=RegFaseB
~ winding=2  vreg=122  band=2  ptratio=20 ctprim=700  R=3   X=9

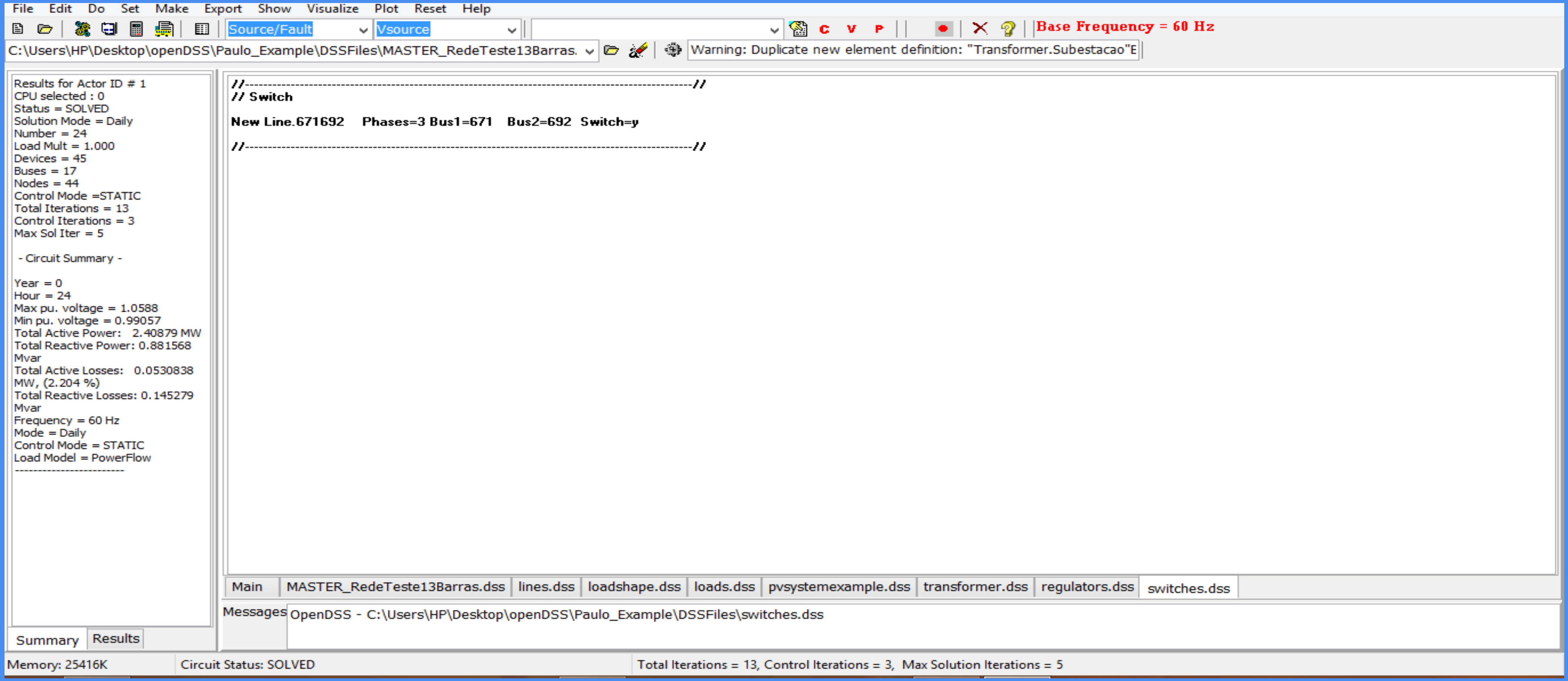
//Fase C
New Transformer.RegFaseC phases=1 xhl=0.01 %LoadLoss=0.001
~ wdg=1 bus=650.3   kV=2.4    kva=1666.7
~ wdg=2 bus=Reg.3   kV=2.4    kva=1666.7
New regcontrol.RegFaseC  transformer=RegFaseC
~ winding=2  vreg=122  band=2  ptratio=20 ctprim=700  R=3   X=9

//---------------------------------------------------------------------------------------------------//
```

```
OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\regulators.dss
```

```
Memory: 25416K    Circuit Status: SOLVED    Total Iterations = 13, Control Iterations = 3,  Max Solution Iterations = 5
```

SWITCHES


File
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Make
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Show
Visualize
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Reset
Help
Source/Fault
Vsource
C
V
P
Base Frequency = 60 Hz
Main
MASTER_RedeTeste13Barras.dss
lines.dss
loadshape.dss
loads.dss
pvsystemexample.dss
transformer.dss
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Summary
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C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\MASTER_RedeTeste13Barras.

Warning: Duplicate new element definition: "Transformer.Subestacao"E

```
Results for Actor ID # 1
CPU selected : 0
Status = SOLVED
Solution Mode = Daily
Number = 24
Load Mult = 1.000
Devices = 45
Buses = 17
Nodes = 44
Control Mode =STATIC
Total Iterations = 13
Control Iterations = 3
Max Sol Iter = 5

 - Circuit Summary -

Year = 0
Hour = 24
Max pu. voltage = 1.0588
Min pu. voltage = 0.99057
Total Active Power:   2.40879 MW
Total Reactive Power: 0.881568
Mvar
Total Active Losses:   0.0530838
MW, (2.204 %)
Total Reactive Losses: 0.145279
Mvar
Frequency = 60 Hz
Mode = Daily
Control Mode = STATIC
Load Model = PowerFlow
------------------------
```

```
//--------------------------------------------------------------------------------------------//
// Switch

New Line.671692    Phases=3 Bus1=671    Bus2=692  Switch=y

//--------------------------------------------------------------------------------------------//
```

Messages: OpenDSS - C:\Users\HP\Desktop\openDSS\Paulo_Example\DSSFiles\switches.dss

Memory: 25416K | Circuit Status: SOLVED | Total Iterations = 13, Control Iterations = 3, Max Solution Iterations = 5