Resolução Exercícios

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VII Simpósio Brasileiro de Sistemas Elétricos

Niterói – RJ

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SBSE 2018

VII Simpósio Brasileiro de Sistemas Elétricos

Questão 1

1.1 e 1.2

```
(Power Flow into element from indicated Bus)

Power Delivery Elements

  Bus                  Phase     kW     +j   kvar         kVA          PF

ELEMENT = "Vsource.SOURCE"
SOURCEBUS                  1     -4109.2 +j   -658.1     4161.5        0.9874
SOURCEBUS                  2     -3767.2 +j   -462.8     3795.6        0.9925
SOURCEBUS                  3     -4107.3 +j   -264.3     4115.8        0.9979
   TERMINAL TOTAL .............-11983.7 +j  -1385.2    12063.5        0.9934
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 = "Load.2224500658A0"
SX3784018A                 1       1.8 +j    0.4         1.8        0.9700
SX3784018A                 2       1.8 +j    0.4         1.8        0.9700
SX3784018A                 0       0.0 +j    0.0         0.0        1.0000
  TERMINAL TOTAL  .............      3.6 +j      0.9         3.7        0.9700


Total Circuit Losses = 1210.3 +j 2768.3
```

1.3

```
 Transformer.VREG4_A          0.00377,     0.00     0.0377429
"Transformer.VREG4_B"         0.00523,     0.00     0.0522711
"Transformer.VREG4_C"         0.00387,     0.00     0.0386604

LINE LOSSES=                    1034.7 kW
TRANSFORMER LOSSES=              175.6 kW

TOTAL LOSSES=                    1210.3 kW

TOTAL LOAD POWER =              10773.2 kW
Percent Losses for Circuit =    11.23 %
```

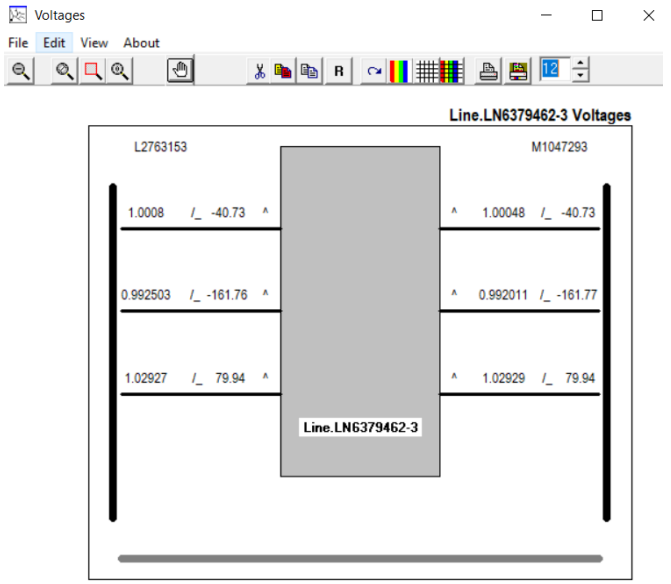
1.4

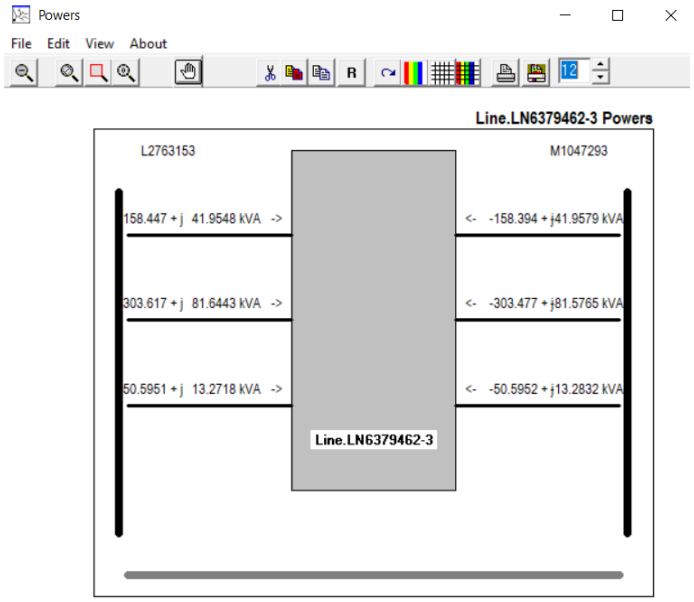
LINE.LN6379462-3

LINE.LN6379462-3

Close | Update

Property	Value
bus1	l2763153
bus2	m1047293
linecode	3PH_H-4_ACSR4_ACSR4_ACSR4_ACSR
length	0.04834725
phases	3
r1	----
x1	----
r0	----
x0	----
C1	----
C0	----
rmatrix	[1.6834 |0.138324 1.67686 |0.142669 0.139294
xmatrix	[0.9273 |0.432623 0.932728 |0.412253 0.450469
cmatrix	[7.60098 |-1.99751 7.88811 |-1.66797 -2.32489
Switch	False
Rg	0.01805
Xg	0.155081
rho	100
geometry	
units	km
spacing	
wires	
EarthModel	Deri
cncables	
tscables	
B1	----
B0	----
normamps	400
emergamps	600
faultrate	0.1
pctperm	20
repair	3
basefreq	60
enabled	true



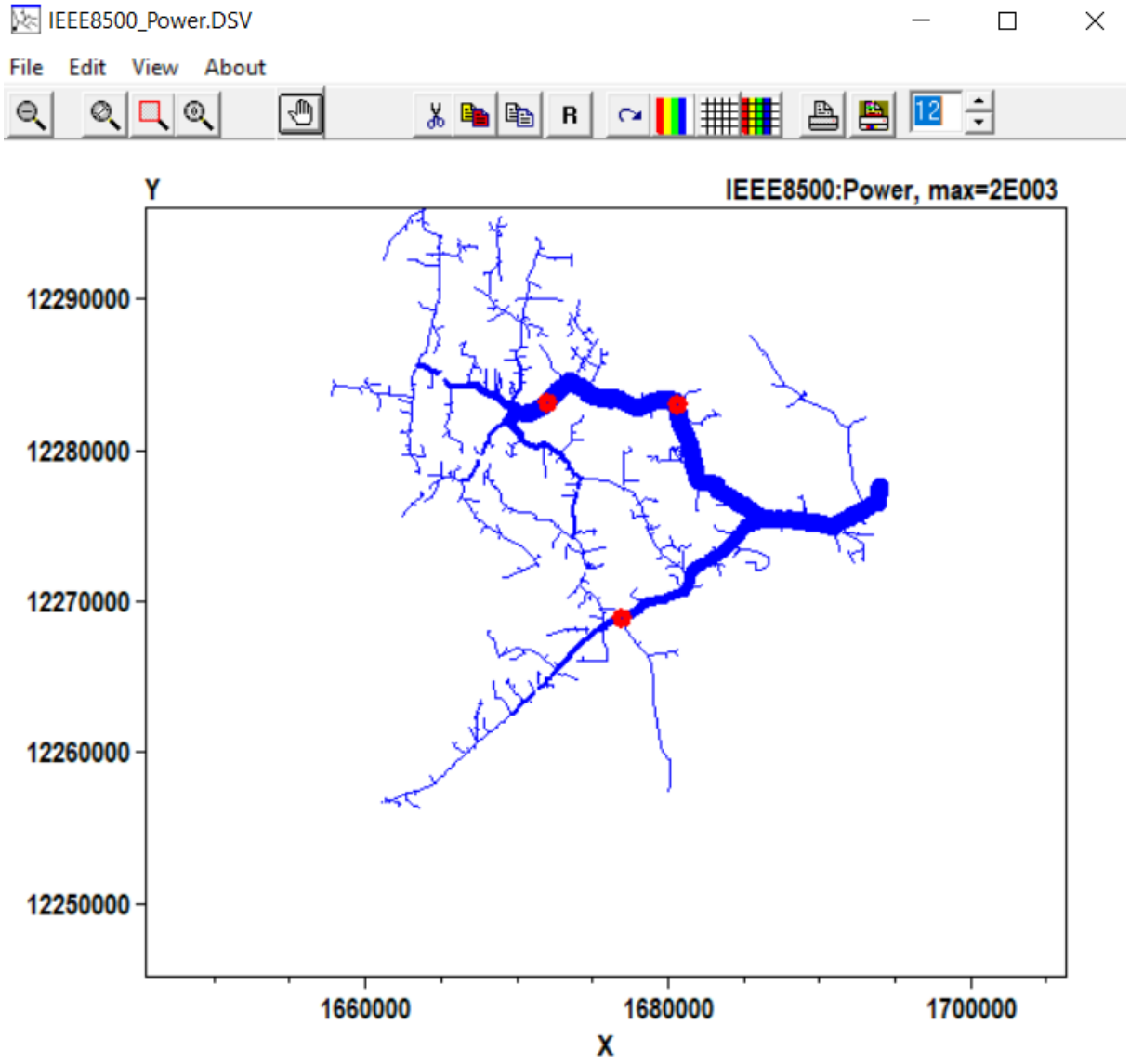


1.5

CONTROLLED TRANSFORMER TAP SETTINGS

Name	Tap	Min	Max	Step	Position
feeder_rega	1.01250	0.90000	1.10000	0.00625	2
feeder_regb	1.01250	0.90000	1.10000	0.00625	2
feeder_regc	1.00625	0.90000	1.10000	0.00625	1

1.6



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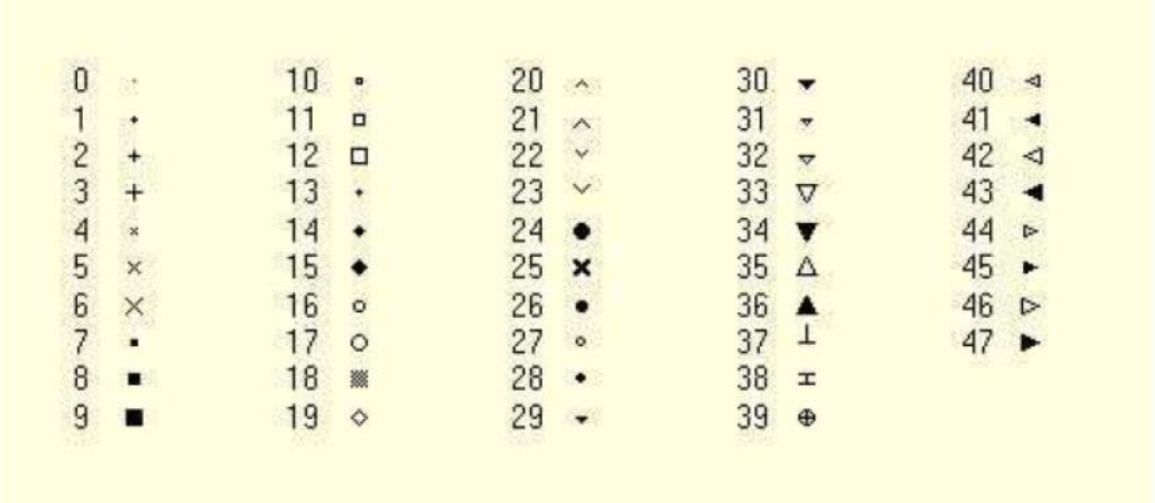
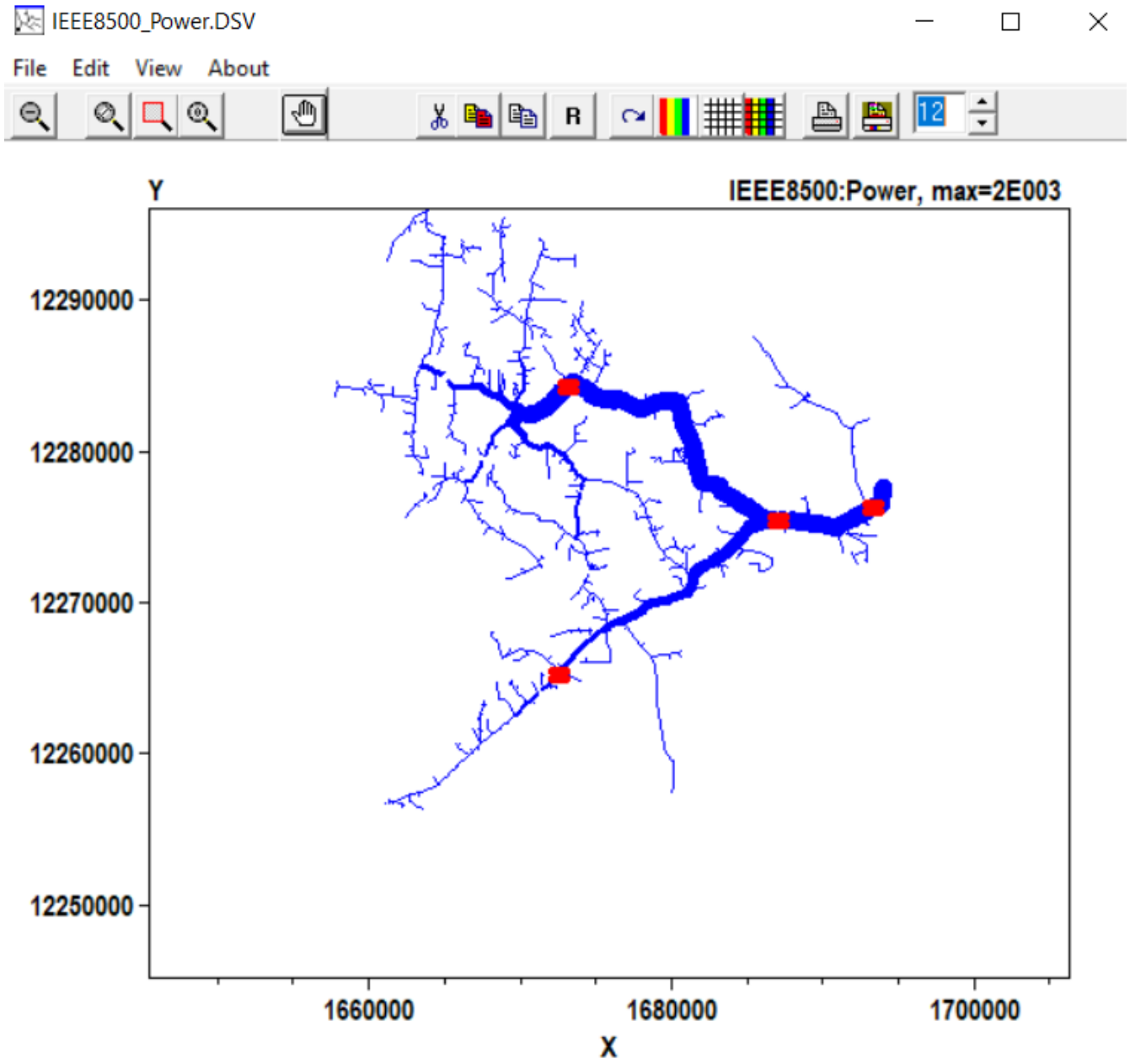
1.6

MarkerCode:



1.7



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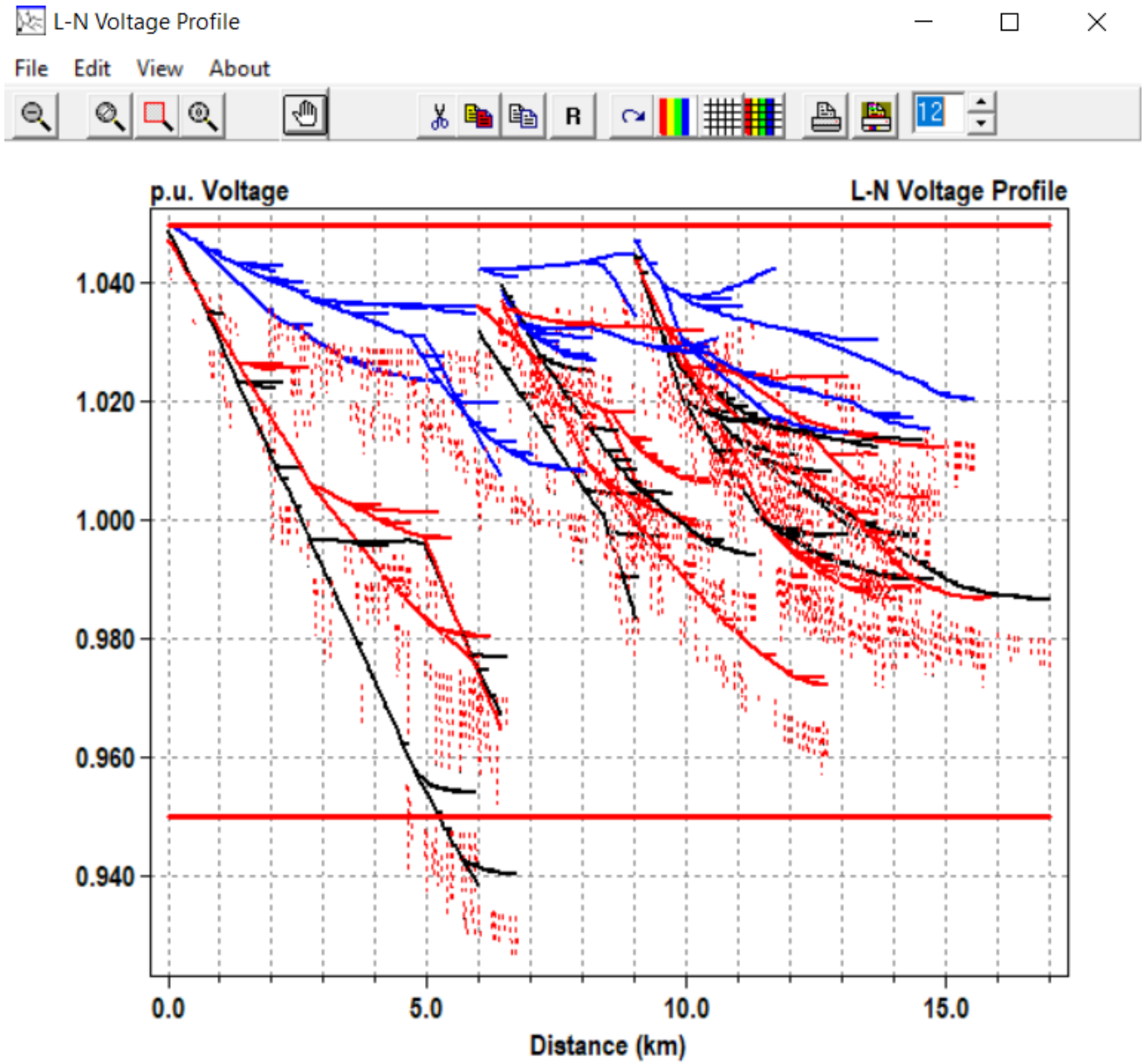
1.8

```
! Questao 1 - Simulacao no modo SnapShot

Compile (master.dss)

New Energymeter.m1 Line.ln5815900-1 1

Set Maxiterations=50     ! Sometimes the solution takes more than the default 15 iterations

set loadmult=1.1

Solve
```

1.9



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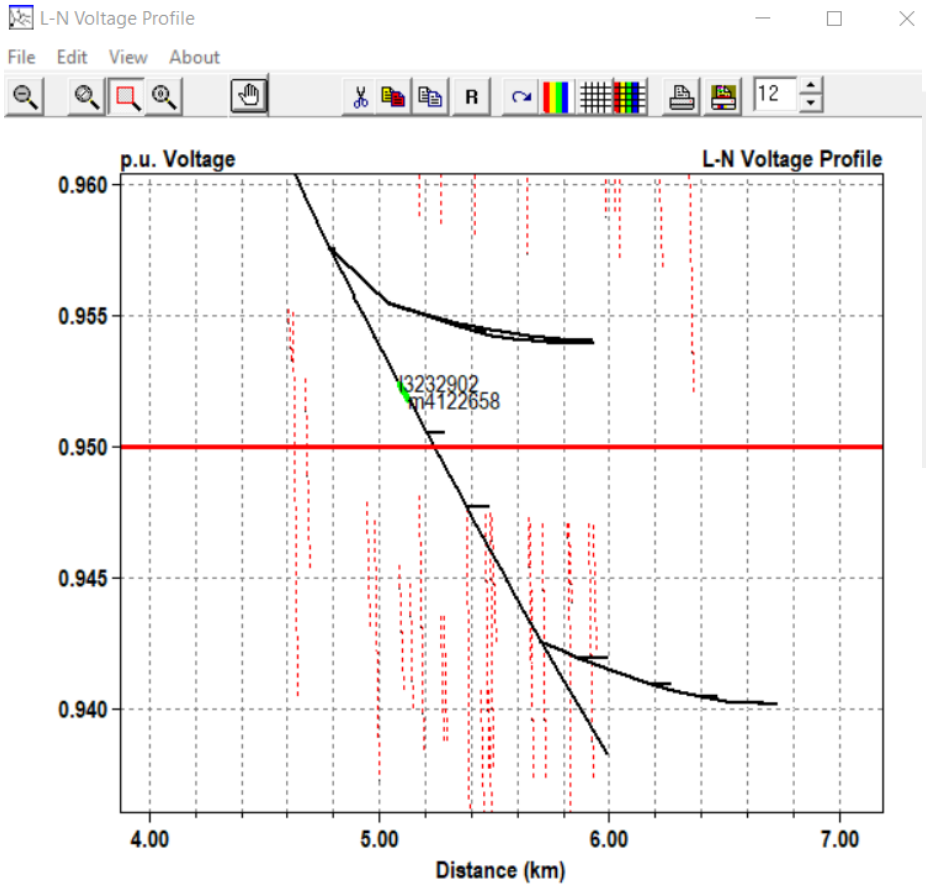
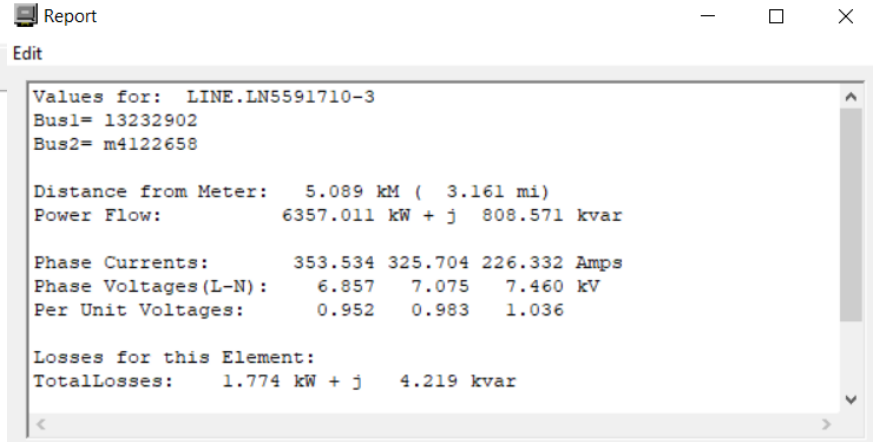
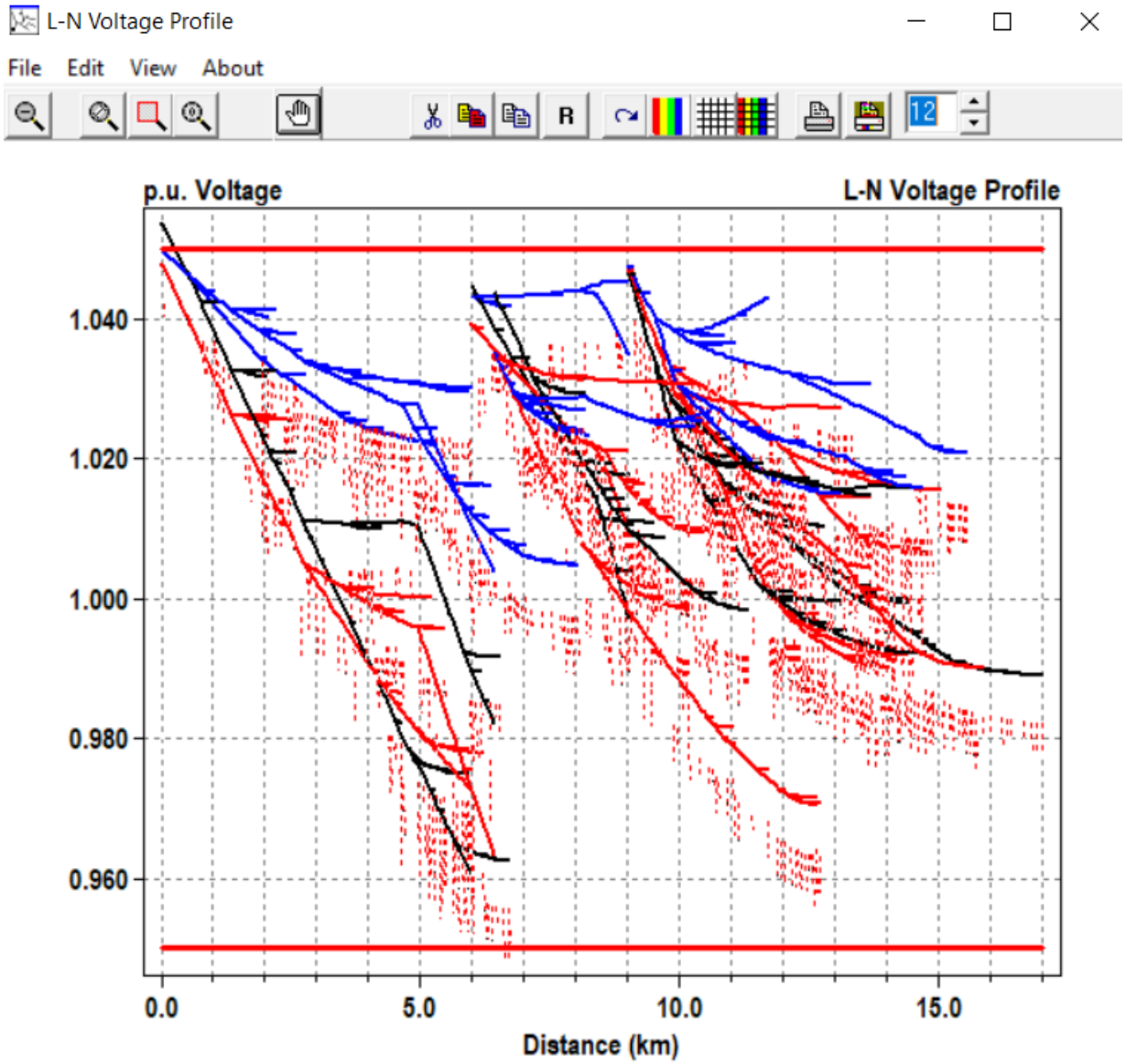
1.9






```
New Capacitor.MeuCap phases=1 kvar=200 bus1=l3232902.1 kv=7.2
```

1.10



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Questão 2

2.1

```
Compile (master.dss)

New Energymeter.m1 Line.

Set Maxiterations=20     ! 

Set mode=daily
Set stepsize=1h
Set Number = 24
Solve
```

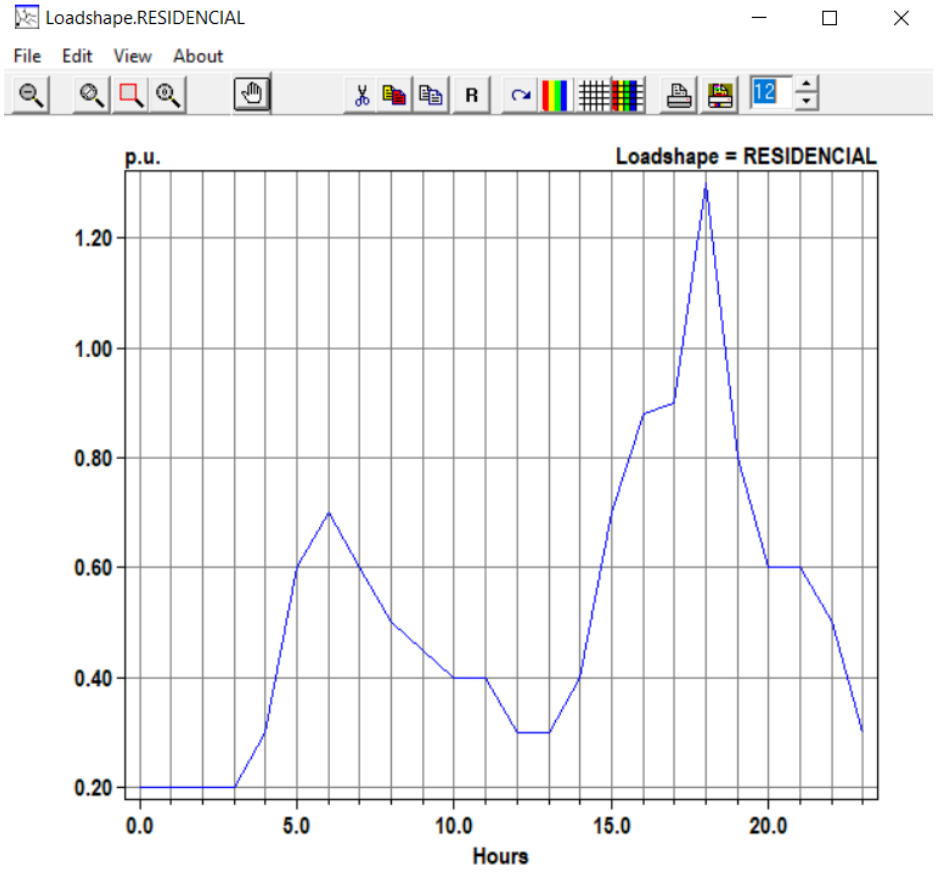
2.2

LOAD.328365B0

LOAD.328365B0

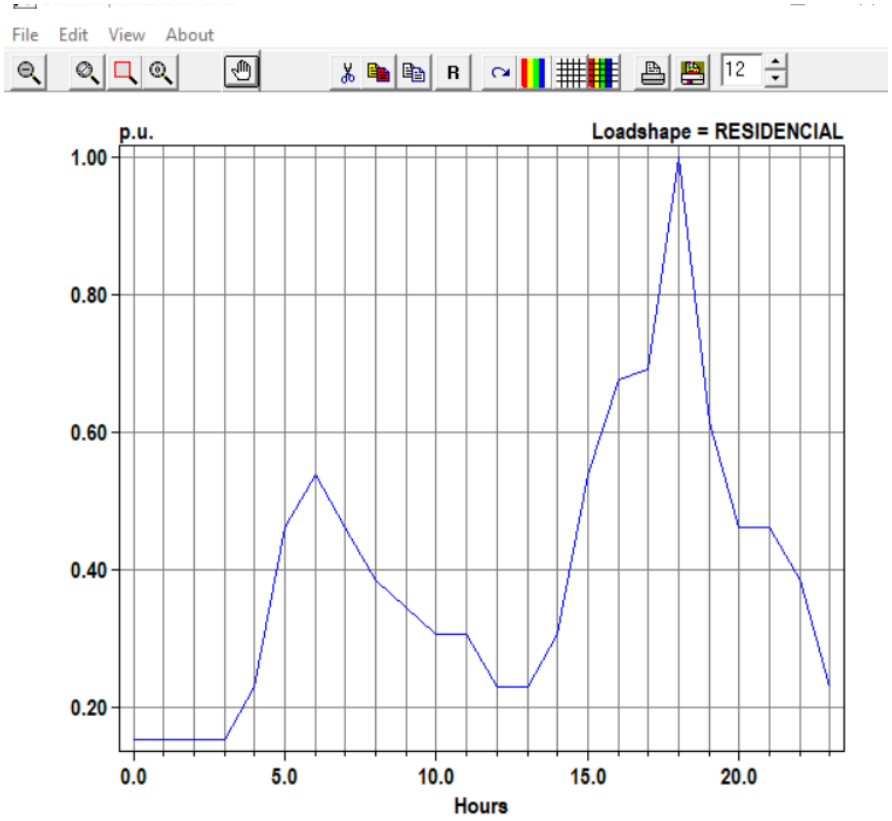
Close | Update

Property	Value
phases	2
bus1	sx3179646b.1.2
kV	0.208
kW	14.59
pf	0.97
model	1
yearly	
daily	residencial
duty	
growth	
conn	wye
kvar	3.65659867931711
Rneut	-1
Xneut	0
status	variable
class	1
Vminpu	.88
Vmaxpu	1.05
Vminnorm	0.0
Vminemerg	0.0
xfkVA	0.0
allocationfac	0.5
kVA	15.0412371134021
%mean	50
%stddev	10
CVRwatts	1
CVRvars	2
kwh	0
kwhdays	30
Cfactor	4
CVRcurve	
NumCust	1
ZIPV	
%SeriesRL	50
RelWeight	1
Vlowpu	0.5



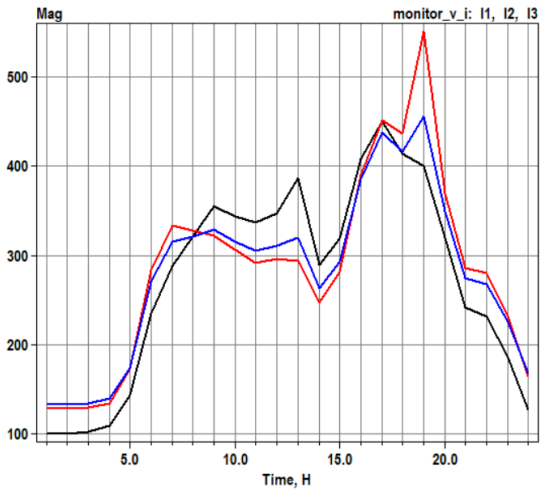
2.2

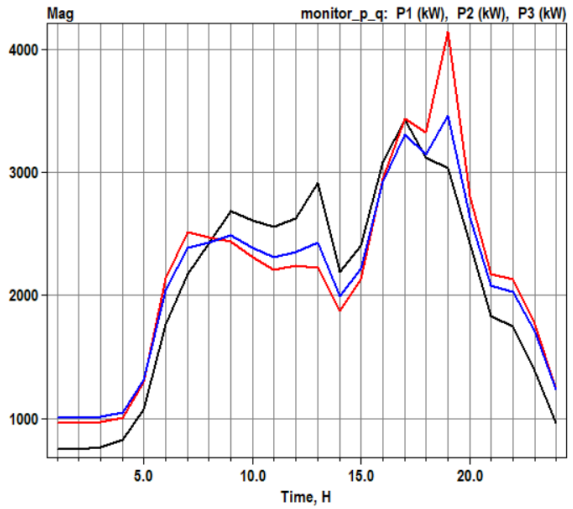
```
// Redirect  Loads.dss      ! Balanced Loads
Redirect  Capacitors.dss
Redirect  CapControls.dss
Redirect  Regulators.dss

New Loadshape.industrial npts=24 interval=1 mult=(0.1 0.1 0.11 0.15 0.18 0.21 0.32 0.61 0.9 0.92 0.96 1 1.3 0.88 0.87 0.85 0.8 0.6 0 0.33 0.25 0.20 0.1 0.1)  action=normalize
New Loadshape.residencial npts=24 interval=1 mult=(0.2 0.2 0.2 0.2 0.3 0.6 0.7 0.6 0.5 0.45 0.4 0.4 0.3 0.3 0.4 0.7 0.88 0.9 1.3 0.8 0.6 0.6 0.5 0.3) action=normalize

Redirect  new_loads.dss     !arquivo com o loadshape

! Let DSS estimate the voltage bases
Set voltagebases=[115, 12.47,  0.48, 0.208]
Calcvoltagebases     ! This also establishes the bus list

! Load in bus coordintes now that bus list is established
Buscoords  Buscoords.dss
```

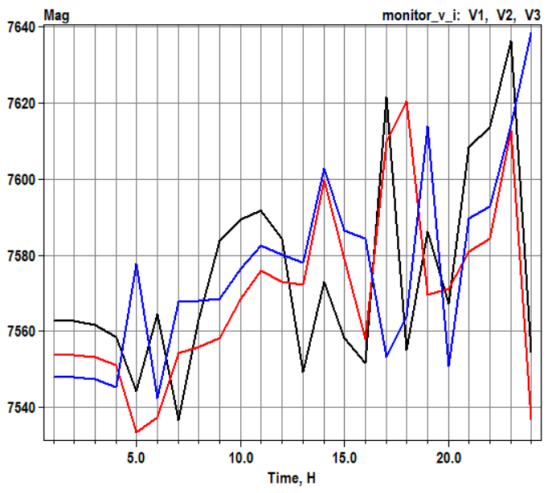


2.3

```
New Monitor.Monitor_V_I element=Line.ln5815900-1 terminal=1 mode=0 vipolar=yes
New Monitor.Monitor_P_Q element=Line.ln5815900-1 terminal=1 mode=1 ppolar=no

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

Export monitors monitor_v_i
Plot monitor object= monitor_v_i channels=(1 3 5 )
Export monitors monitor_v_i
Plot monitor object= monitor_v_i channels=(7 9 11 )
Export monitors monitor_p_q
Plot monitor object= monitor_p_q channels=(1 3 5 )
```







2.4

```
ENERGY METER VALUES

Registers:
Reg 1 = kWh
Reg 2 = kvarh
Reg 3 = Max kW
Reg 4 = Max kVA
Reg 5 = Zone kWh
Reg 6 = Zone kvarh
Reg 7 = Zone Max kW
Reg 8 = Zone Max kVA
Reg 9 = Overload kWh Normal
Reg 10 = Overload kWh Emerg
Reg 11 = Load EEN
Reg 12 = Load UE
Reg 13 = Zone Losses kWh
Reg 14 = Zone Losses kvarh
Reg 15 = Zone Max kW Losses
Reg 16 = Zone Max kvar Losses
Reg 17 = Load Losses kWh
Reg 18 = Load Losses kvarh
Reg 19 = No Load Losses kWh
```

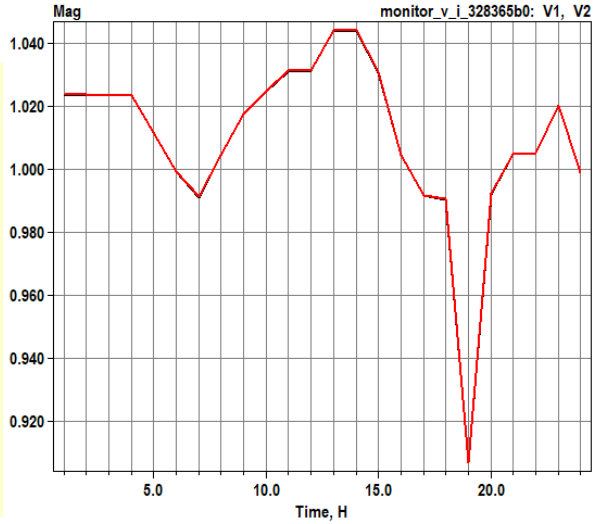
2.5

CONTROLLED TRANSFORMER TAP SETTINGS

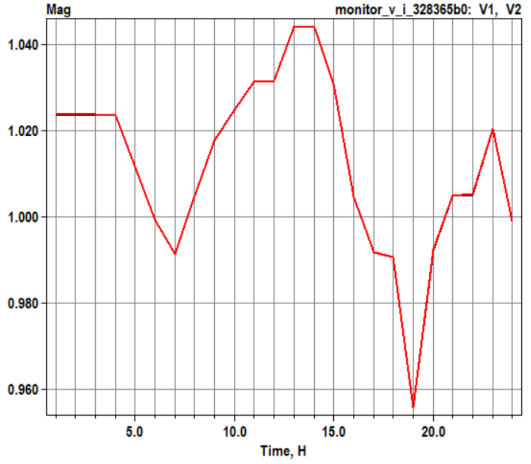
Name	Tap	Min	Max	Step	Position
feeder_rega	1.00000	0.90000	1.10000	0.00625	0
feeder_regb	1.00000	0.90000	1.10000	0.00625	0
feeder_regc	1.00625	0.90000	1.10000	0.00625	1

2.6

```
Export monitors monitor_v_i
Plot monitor object= monitor_v_i channels=(1 3 5 )
Export monitors monitor_v_i
Plot monitor object= monitor_v_i channels=(7 9 11 )
Export monitors monitor_p_q
Plot monitor object= monitor_p_q channels=(1 3 5 )


Export monitors monitor_v_i_328365b0
Plot monitor object= monitor_v_i_328365b0 channels=(1 3) base=[120 120]
```



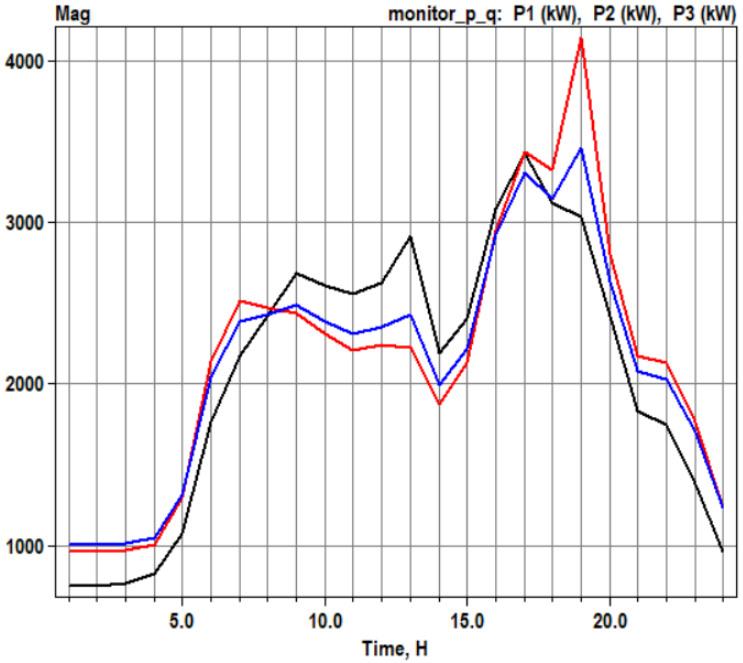

```
New Monitor.Monitor_P_Q element=Line.ln5815900-1 terminal=1 mode=1 ppolar=
New Monitor.Monitor_V_I_328365B0 element=Load.328365B0 terminal=1 mode=


New Capacitor.cap phases=2 kvar=100 bus1=sx3179646b.1.2 kv=0.208

set mode=daily
set stepsize=1h

Capacitor.cap.enabled=no
set number=18
Solve

Capacitor.cap.enabled=yes
set number=1
Solve

Capacitor.cap.enabled=no
set number=5
Solve
```



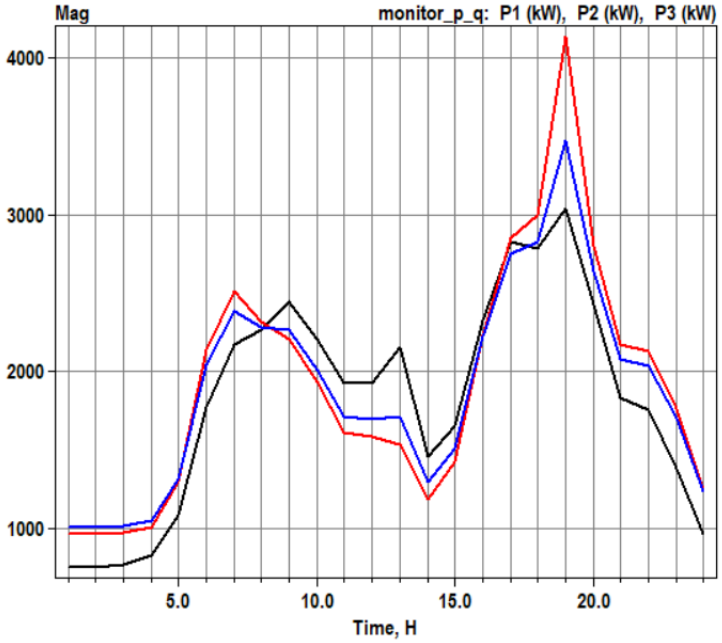
Questão 3

3.1

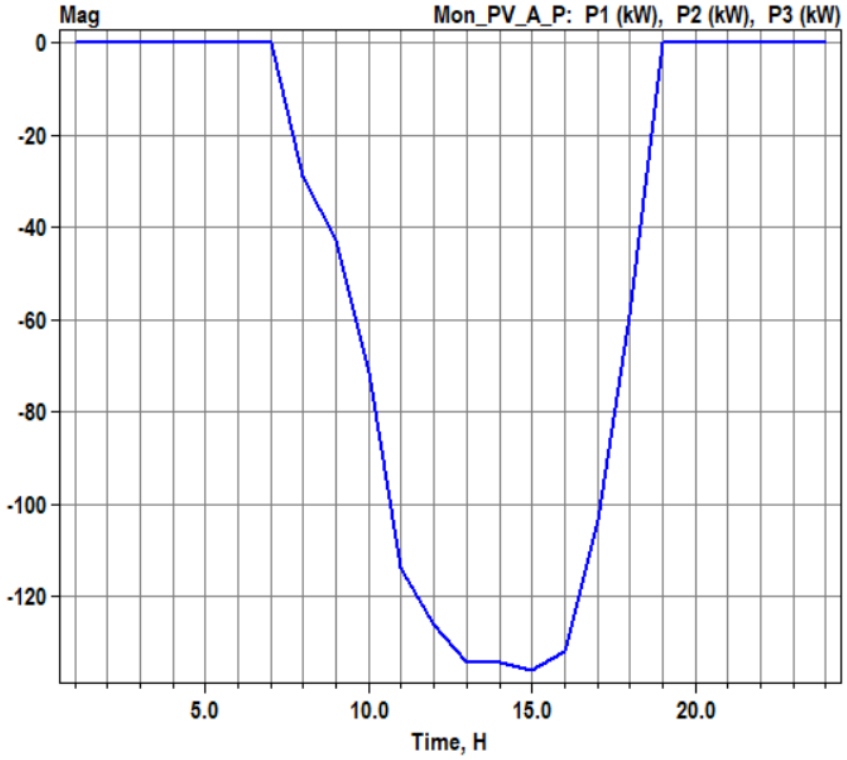
Arquivo PVSystem.dss

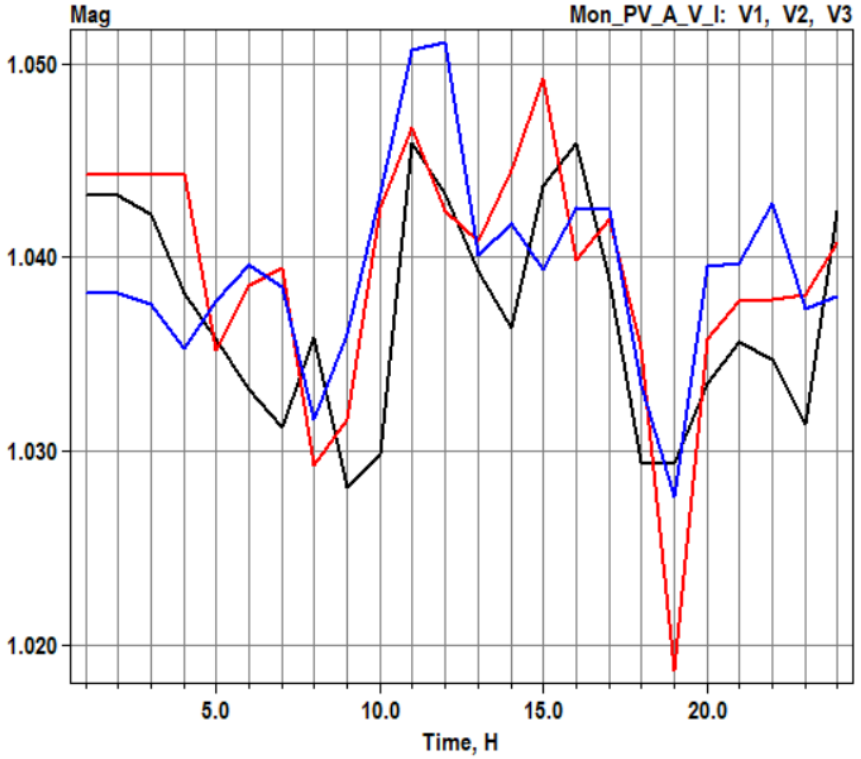



```
ENERGY METER VALUES

Registers:
Reg 1 = kWh
Reg 2 = kvarh
Reg 3 = Max kW
Reg 4 = Max kVA
Reg 5 = Zone kWh
Reg 6 = Zone kvarh
Reg 7 = Zone Max kW
Reg 8 = Zone Max kVA
Reg 9 = Overload kWh Normal
Reg 10 = Overload kWh Emerg
Reg 11 = Load EEN
Reg 12 = Load UE
Reg 13 = Zone Losses kWh
Reg 14 = Zone Losses kvarh
Reg 15 = Zone Max kW Losses
Reg 16 = Zone Max kvar Losses
Reg 17 = Load Losses kWh
Reg 18 = Load Losses kvarh
Reg 19 = No Load Losses kWh
```

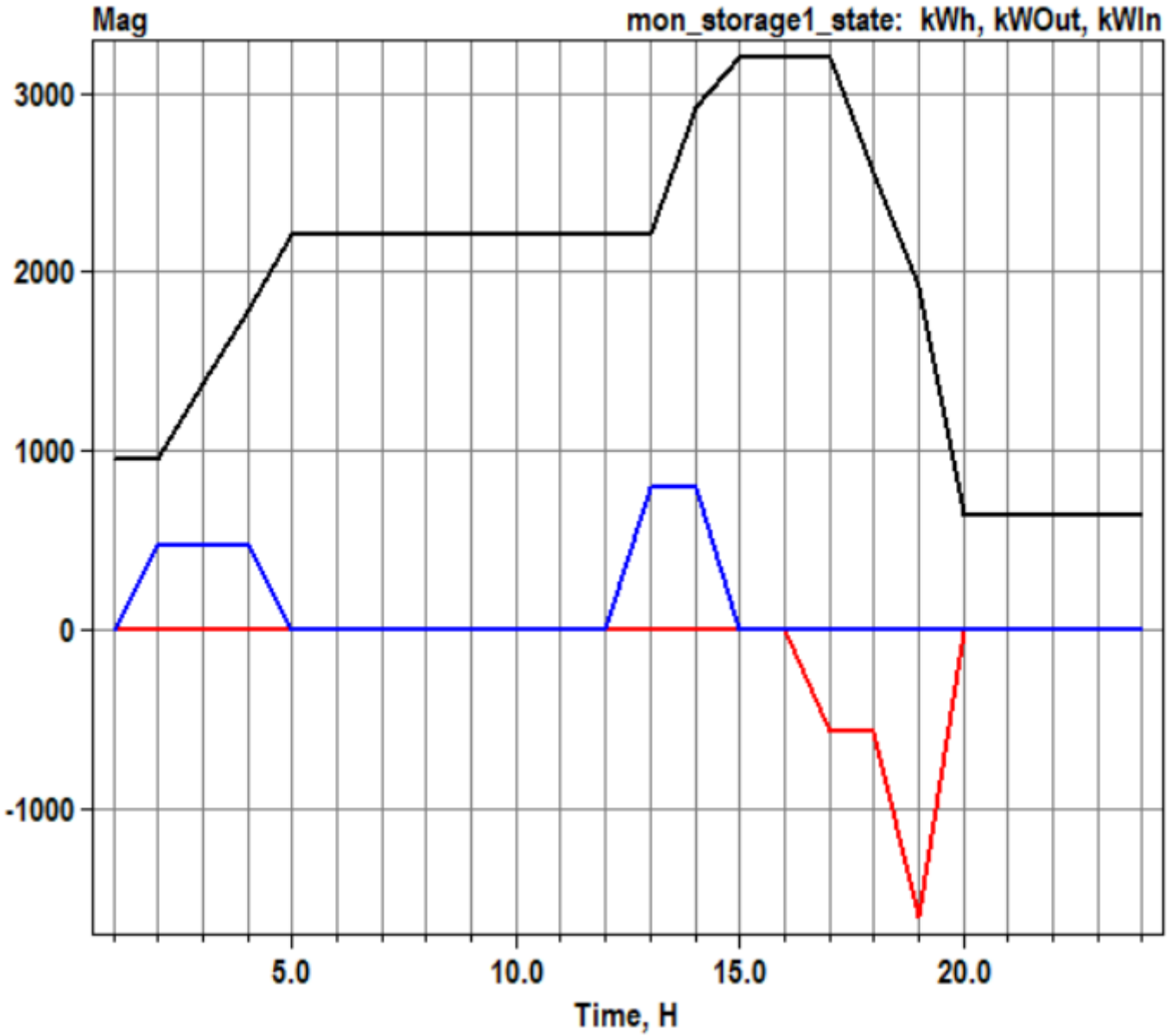


3.2

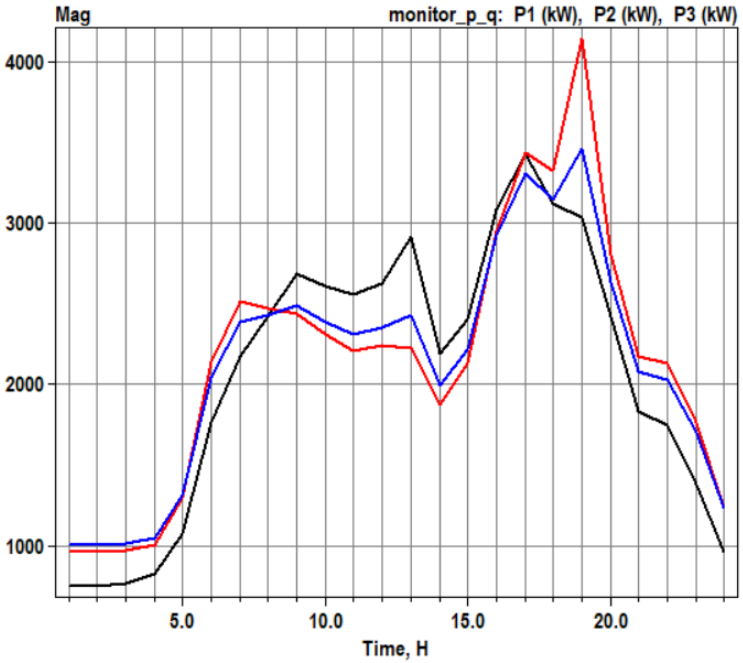

Mag
Mon_PV_A_P: P1 (kW), P2 (kW), P3 (kW)
0
-20
-40
-60
-80
-100
-120
5.0
10.0
15.0
20.0
Time, H

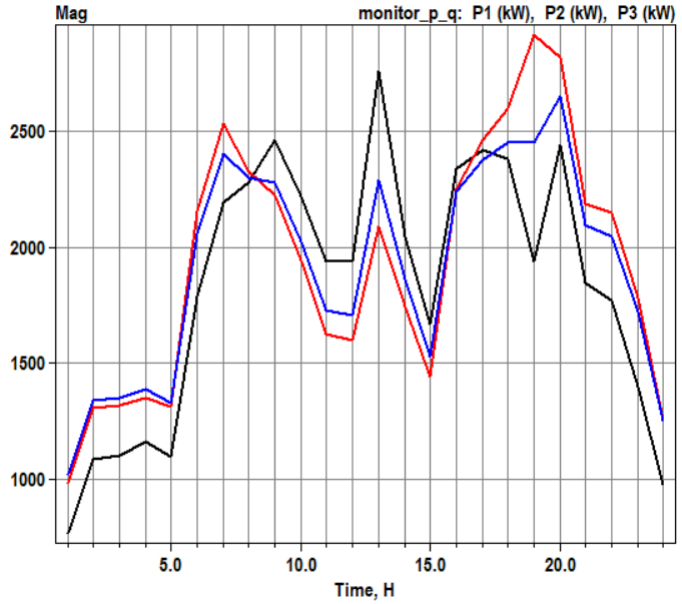

Mag
Mon_PV_A_V_I: V1, V2, V3
1.050
1.040
1.030
1.020
5.0
10.0
15.0
20.0
Time, H

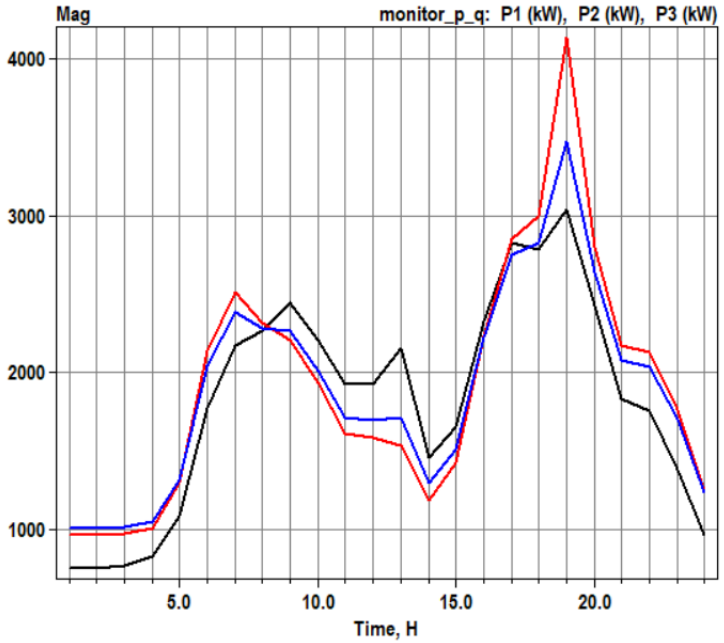
3.5


Mag
mon_storage1_state: kWh, kWOut, kWIn
3000
2000
1000
0
-1000
5.0
10.0
15.0
20.0
Time, H

3.6


Mag
monitor_p_q: P1 (kW), P2 (kW), P3 (kW)
4000
3000
2000
1000
5.0
10.0
15.0
20.0
Time, H


Mag
monitor_p_q: P1 (kW), P2 (kW), P3 (kW)
2500
2000
1500
1000
5.0
10.0
15.0
20.0
Time, H


Mag
monitor_p_q: P1 (kW), P2 (kW), P3 (kW)
4000
3000
2000
1000
5.0
10.0
15.0
20.0
Time, H

Obrigado!
Dúvidas?