OpenDSS – Alimentador teste IEEE 4 barras
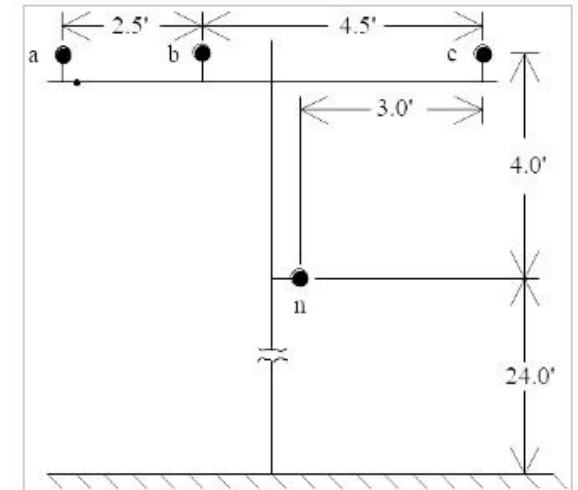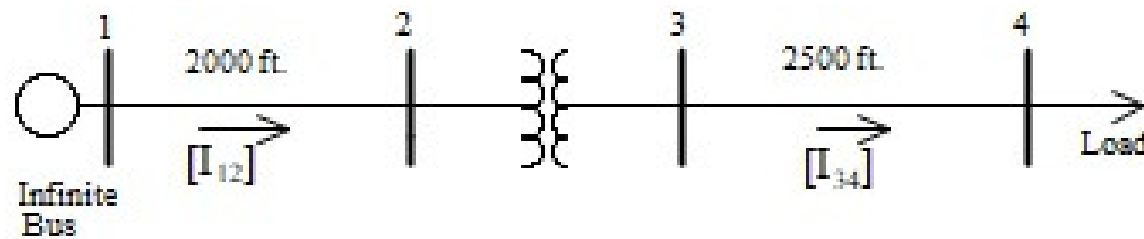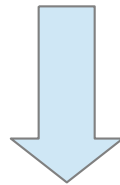

Figure 2 – Pole Configuration

Phase Conductor: 336,400 26/7
GMR = 0.0244 ft., Resistance = 0.306 Ω/mile, Diameter = 0.721 inch

Neutral Conductor: 4/0 6/1 ACSR
GMR = 0.00814 ft., Resistance = 0.592 Ω/mile, Diameter = 0.563 inch

OpenDSS – Começando Script

1) Sempre começar com clear
2) Colocar nome do circuito==> circuit.NOME
3) Colocar baseKV e numero de fases
4) Colocar capacidade da fonte ~mvasc3

```
clear

! Sistema teste de 4 barras da IEEE

new object= circuit.4Barras basekV=12.47 phases=3
~ mvasc3=200000
```
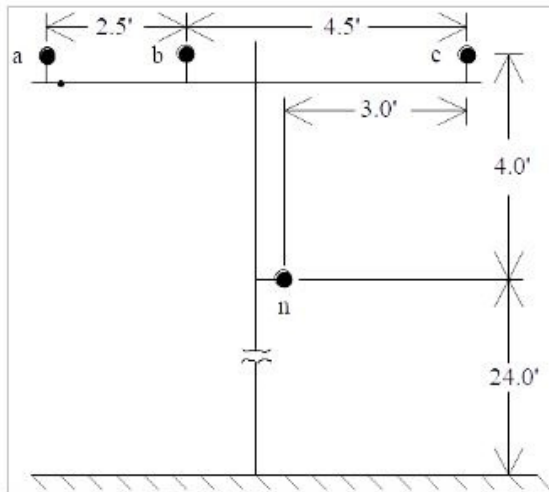
# OpenDSS – Definindo Condutores e geometria

Figure 2 – Pole Configuration

```
! Definindo geometria da linha
new linegeometry.4fios nconds=4 nphases=3 reduce=yes
~ cond=1 wire=condutor units=ft x=-4    h=28
~ cond=2 wire=condutor units=ft x=-1.5 h=28
~ cond=3 wire=condutor units=ft x=3    h=28
~ cond=4 wire=neutro   units=ft x=0    h=24
```

Phase Conductor: 336,400 26/7
   GMR = 0.0244 ft., Resistance = 0.306 Ω/mile, Diameter = 0.721 inch

Neutral Conductor: 4/0 6/1 ACSR
   GMR = 0.00814 ft., Resistance = 0.592 Ω/mile, Diameter = 0.563 inch

```
! Definindo condutores
new wiredata.condutor Runits=mi Rac=0.306 GMRunits=ft GMRac=0.0244  Radunits=in Diam=0.721
new wiredata.neutro   Runits=mi Rac=0.592 GMRunits=ft GMRac=0.00814 Radunits=in Diam=0.563
```

OpenDSS – Definindo linhas e transformador
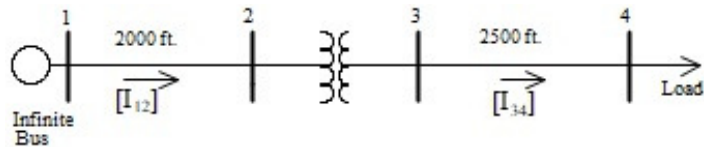
Nome das barras no script:
n1 , n2, n3 e n4
Elementos conetados
n1 =sourcebus
n1 – n2 ==> linha1
n2 – n3 ==> transformador
n3 – n4 ==> linha2
n4 ==> carga1

Three-Phase Transformer Data:

Connection	kVA	kVLL-high	kVLL-low	R - %	X - %
Step-Down	6,000	12.47	4.16	1.0	6.0

```
! Transformador trifasico 12.47/4.16 KV Y-Y
new transformer.trafo1 xhl=6
~ wdg=1 bus=n2 conn=wye kV=12.47 kVA=6000 %r=0.5
~ wdg=2 bus=n3 conn=wye kV=4.16  kVA=6000 %r=0.5
```

```
! Linha 12.47 KV
new line.linha1 geometry=4fios length=2000 units=ft bus1=sourcebus bus2=n2

! Linha 4.16 KV
new line.linha2 bus1=n3 bus2=n4 geometry=4fios length=2500 units=ft
```

OpenDSS – Definindo carga

Closed Connections Load Data:

	Balanced
Phase-1	
k W	1800
Power Factor	0.9 lag
Phase-2	
k W	1800
Power Factor	0.9 lag
Phase-3	
k W	1800
Power Factor	0.9 lag

```
! Carga equilibada conetada em estrela  4.16 KV
new load.carga1 phases=3 bus1=n4 conn=wye kV=4.16 kW=5400 pf=0.9  model=1
~ vminpu=0.75    ! potencia constanste ate atingir 0.75 p.u. de tensão
```

Script Completo

```
clear

! Sistema teste de 4 barras da IEEE

new object= circuit.4Barras basekV=12.47 phases=3
~ mvasc3=200000

! Definindo condutores
new wiredata.condutor Runits=mi Rac=0.306 GMRunits=ft GMRac=0.0244  Radunits=in Diam=0.721
new wiredata.neutro   Runits=mi Rac=0.592 GMRunits=ft GMRac=0.00814 Radunits=in Diam=0.563

! Definindo geometria da linha
new linegeometry.4fios nconds=4 nphases=3 reduce=yes
~ cond=1 wire=condutor units=ft x=-4   h=28
~ cond=2 wire=condutor units=ft x=-1.5 h=28
~ cond=3 wire=condutor units=ft x=3    h=28
~ cond=4 wire=neutro   units=ft x=0    h=24

! Transformador trifasico 12.47/4.16 KV Y-Y
new transformer.trafo1 xhl=6
~ wdg=1 bus=n2 conn=wye kV=12.47 kVA=6000 %r=0.5
~ wdg=2 bus=n3 conn=wye kV=4.16  kVA=6000 %r=0.5

! Linha 12.47 KV
new line.linha1 geometry=4fios length=2000 units=ft bus1=sourcebus bus2=n2

! Linha 4.16 KV
new line.linha2 bus1=n3 bus2=n4 geometry=4fios length=2500 units=ft

! Carga equilibrada conectada em estrela  4.16 KV
new load.carga1 phases=3 bus1=n4 conn=wye kV=4.16 kW=5400 pf=0.9  model=1
~ vminpu=0.75    ! potencia constante ate atingir 0.75 p.u. de tensão
Solve

show voltages LN Nodes
```

Resultado Tensões

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	7.1985 /_	0.0	0	0.000	1-2	12.47 /_	30.0	0
-	2	7.2011 /_	-120.0	0	0.000	2-3	12.47 /_	-90.0	0
-	3	7.1985 /_	120.0	0	0.000	3-1	12.47 /_	150.0	0
N2	1	7.1061 /_	-0.4	0	0.000	1-2	12.339 /_	29.7	0
-	2	7.1418 /_	-120.3	0	0.000	2-3	12.352 /_	-90.4	0
-	3	7.1203 /_	119.6	0	0.000	3-1	12.32 /_	149.6	0
N3	1	2.2474 /_	-3.7	0	0.000	1-2	3.9071 /_	26.6	0
-	2	2.2693 /_	-123.5	0	0.000	2-3	3.9213 /_	-93.6	0
-	3	2.2558 /_	116.4	0	0.000	3-1	3.9021 /_	146.3	0
N4	1	1.9204 /_	-9.1	0	0.000	1-2	3.4381 /_	22.5	0
-	2	2.0644 /_	-128.3	0	0.000	2-3	3.5198 /_	-99.4	0
-	3	1.983 /_	110.9	0	0.000	3-1	3.3799 /_	140.3	0

4Barras_VLN_Node.Txt - Bloco de Notas

Arquivo Editar Formatar Exibir Ajuda

Resultado Correntes

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           347.39 /_  145.1 =    -284.76 +j     198.98
SOURCEBUS    2           323.24 /_   25.8 =     290.94 +j     140.84
SOURCEBUS    3           336.41 /_  -95.0 =     -29.26 +j    -335.13
------------
SOURCEBUS    0           347.39 /_  -34.9 =     284.76 +j    -198.98
SOURCEBUS    0           323.24 /_ -154.2 =    -290.94 +j    -140.84
SOURCEBUS    0           336.41 /_   85.0 =      29.26 +j     335.13

ELEMENT = "Transformer.TRAFO1"
N2           1           347.39 /_  -34.9 =     284.76 +j    -198.99
N2           2           323.24 /_ -154.2 =    -290.95 +j    -140.83
N2           3           336.41 /_   85.0 =      29.27 +j     335.14
N2           0           23.546 /_  168.5 =    -23.076 +j      4.682
N2         Resid     5.744E-007 /_  -51.6 =  3.5686E-007 +j -4.5009E-007
------------
N3           1           1041.3 /_  145.1 =    -853.59 +j     596.48
N3           2           968.96 /_   25.8 =     872.16 +j     422.16
N3           3           1008.4 /_  -95.0 =     -87.74 +j    -1004.6
N3           0           70.581 /_  -11.5 =     69.171 +j     -14.035
N3         Resid     3.7325E-006 /_  -34.5 =  3.0747E-006 +j -2.1161E-006

ELEMENT = "Line.LINHA1"
SOURCEBUS    1           347.39 /_  -34.9 =     284.76 +j    -198.98
SOURCEBUS    2           323.24 /_ -154.2 =    -290.94 +j    -140.84
SOURCEBUS    3           336.41 /_   85.0 =      29.26 +j     335.13
SOURCEBUS Resid         23.545 /_  168.5 =    -23.075 +j      4.6821
------------
N2           1           347.39 /_  145.1 =    -284.76 +j     198.99
N2           2           323.24 /_   25.8 =     290.95 +j     140.83
N2           3           336.41 /_  -95.0 =     -29.27 +j    -335.14
N2         Resid         23.546 /_  -11.5 =     23.076 +j      -4.682
```

Trabalho para casa

Simular o sistema teste da IEEE de transmissão de 14 barras
1) Apresentar o arquivo ".DSS"
2) Se necessário criar o arquivo de definição de linhas ".DSS"
3) Apresentar tensões nodais, potência total ativa e reativa, e perdas
4) Não considerar limite de reativo para os geradores

Dados disponíveis em (só será aceito essa fonte para comparação de resultados):

http://labs.ece.uw.edu/pstca/pf14/pg_tca14bus.htm

IEEE Common Data Format

Tipo barra:
3: slack
0:PQ
1:PV
TAP==>a:1
b-linha: total (b/2+b/2)

Mais detalhes

http://labs.ece.uw.edu/pstca/formats/cdf.txt