

OpenDSS – Alimentador teste IEEE 4 barras

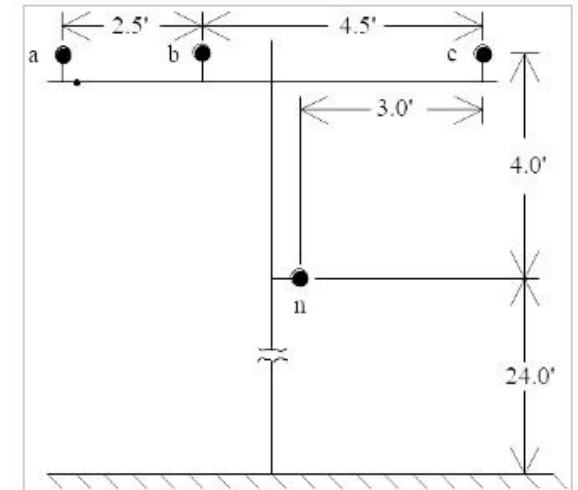
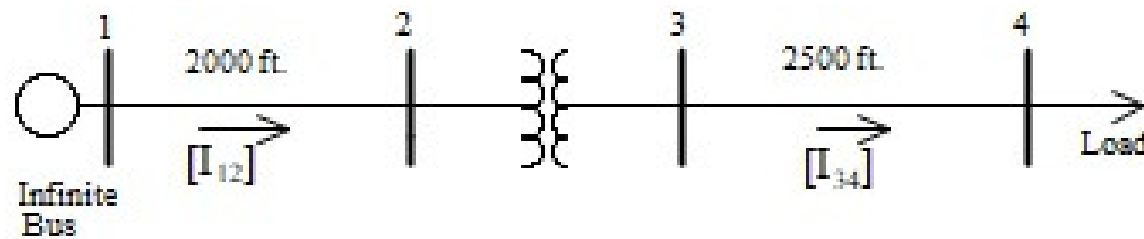


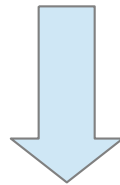
Figure 2 – Pole Configuration

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

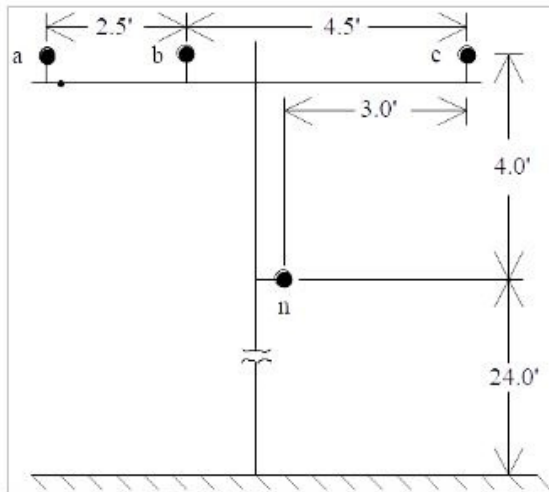


Figure 2 – Pole Configuration

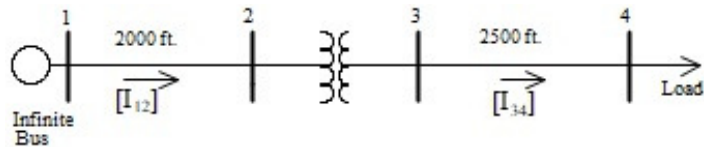
Phase Conductor: 336,400 26/7
 $GMR = 0.0244$ ft., Resistance = $0.306 \Omega/\text{mile}$, Diameter = 0.721 inch

Neutral Conductor: 4/0 6/1 ACSR
 $GMR = 0.00814$ ft., Resistance = $0.592 \Omega/\text{mile}$, Diameter = 0.563 inch

```
! 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
```

```
! 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



```
! 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
```

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=weye kV=12.47 kVA=6000 %r=0.5  
~ wdg=2 bus=n3 conn=weye kV=4.16 kVA=6000 %r=0.5
```

OpenDSS – Definindo carga

Closed Connections Load Data:

	Balanced
Phase-1	
kW	1800
Power Factor	0.9 lag
Phase-2	
kW	1800
Power Factor	0.9 lag
Phase-3	
kW	1800
Power Factor	0.9 lag



! Carga equilibrada 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 voltagens LN Nodes
```

Resultado Tensões

4Barras_VLN_Node.Txt - Bloco de Notas

Arquivo Editar Formatar Exibir Ajuda

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

Resultado Correntes

4Barras_Curr_Elem.Txt - Bloco de Notas

Arquivo Editar Formatar Exibir Ajuda

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.TRAF01"						
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.LINHAI"						
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 de barra P carga (MW) Q carga (Mvar) P gen (MW) Tensão (p.u.) b-shunt

```

08/19/93 UW ARCHIVE
BUS DATA FOLLOWS
100.0 1962 W IEEE 14 Bus Test Case
14 ITEMS
1 Bus 1 HV 1 1 3 1.060 0.0 0.0 0.0 232.4 -16.9 0.0 1.060 0.0 0.0 0.0 0.0
2 Bus 2 HV 1 1 2 1.045 -4.98 21.7 12.7 40.0 42.4 0.0 1.045 50.0 -40.0 0.0 0.0
3 Bus 3 HV 1 1 2 1.010 -12.72 94.2 19.0 0.0 23.4 0.0 1.010 40.0 0.0 0.0 0.0
4 Bus 4 HV 1 1 0 1.019 -10.33 47.8 -3.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
5 Bus 5 HV 1 1 0 1.020 -8.78 7.6 1.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
6 Bus 6 LV 1 1 2 1.070 -14.22 11.2 7.5 0.0 12.2 0.0 1.070 24.0 -6.0 0.0 0.0
7 Bus 7 ZV 1 1 0 1.062 -13.37 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
8 Bus 8 TV 1 1 2 1.090 -13.36 0.0 0.0 0.0 17.4 0.0 1.090 24.0 -6.0 0.0 0.0
9 Bus 9 LV 1 1 0 1.056 -14.94 29.5 16.6 0.0 0.0 0.0 0.0 0.0 0.0 0.19 0.0
10 Bus 10 LV 1 1 0 1.051 -15.10 9.0 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
11 Bus 11 LV 1 1 0 1.057 -14.79 3.5 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
12 Bus 12 LV 1 1 0 1.055 -15.07 6.1 1.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
13 Bus 13 LV 1 1 0 1.050 -15.16 13.5 5.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
14 Bus 14 LV 1 1 0 1.036 -16.04 14.9 5.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
-999
BRANCH DATA FOLLOWS
r (p.u.) x (p.u.) b-linha (p.u.) TAP
20 ITEMS
1 2 1 1 1 0 0.01938 0.05917 0.0528 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
1 5 1 1 1 0 0.05403 0.22304 0.0492 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
2 3 1 1 1 0 0.04699 0.19797 0.0438 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
2 4 1 1 1 0 0.05811 0.17632 0.0340 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
2 5 1 1 1 0 0.05695 0.17388 0.0346 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
3 4 1 1 1 0 0.06701 0.17103 0.0128 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
4 5 1 1 1 0 0.01335 0.04211 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
4 7 1 1 1 0 0.0 0.20912 0.0 0 0 0 0 0 0 0.978 0.0 0.0 0.0 0.0
4 9 1 1 1 0 0.0 0.55618 0.0 0 0 0 0 0 0 0.969 0.0 0.0 0.0 0.0
5 6 1 1 1 0 0.0 0.25202 0.0 0 0 0 0 0 0 0.932 0.0 0.0 0.0 0.0
6 11 1 1 1 0 0.09498 0.19890 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
6 12 1 1 1 0 0.12291 0.25581 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
6 13 1 1 1 0 0.06615 0.13027 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
7 8 1 1 1 0 0.0 0.17615 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
7 9 1 1 1 0 0.0 0.11001 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
9 10 1 1 1 0 0.03181 0.08450 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
9 14 1 1 1 0 0.12711 0.27038 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
10 11 1 1 1 0 0.08205 0.19207 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
12 13 1 1 1 0 0.22092 0.19988 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
13 14 1 1 1 0 0.17093 0.34802 0.0 0 0 0 0 0 0 0.0 0.0 0.0 0.0 0.0
-999
LOSS ZONES FOLLOWS
1 ITEMS
1 IEEE 14 BUS
-99
INTERCHANGE DATA FOLLOWS
1 ITEMS
1 2 Bus 2 HV 0.0 999.99 IEEE14 IEEE 14 Bus Test Case
-9
TIE LINES FOLLOWS
0 ITEMS
-999
END OF DATA
  
```

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>