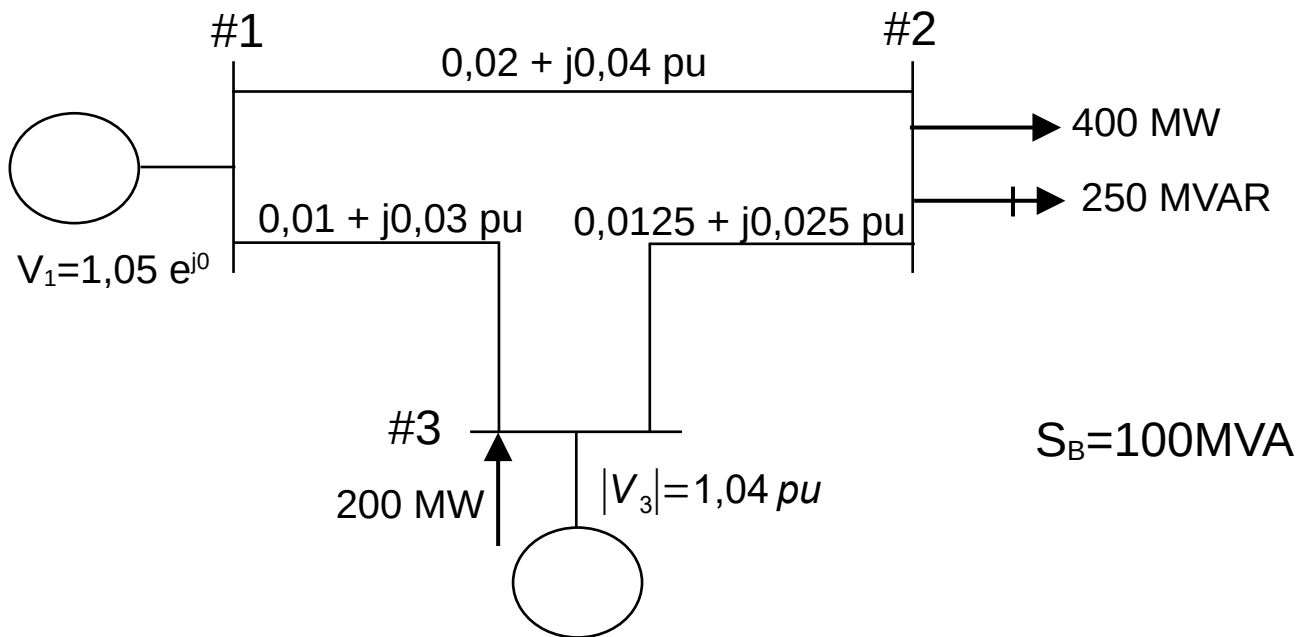




$$y_{12} = (0.02 - j0.04) / (0.02^2 + 0.04^2) = 10 - j20 \text{ pu}$$

$$y_{13} = (0.01 - j0.03) / (0.01^2 + 0.03^2) = 10 - j30 \text{ pu}$$

$$y_{23} = (0.0125 - j0.025) / (0.0125^2 + 0.025^2) = 16 - j32 \text{ pu}$$

Classification des bus :

Bus	Type	Valeurs connues	Valeurs inconnues
1	Slack bus	$V_1 = 1.05 \text{ pu}$, $\delta_1 = 0$	P_1 , Q_1
2	Bus de charge	$P_L2 = 4 \text{ pu}$, $Q_L2 = 2.5 \text{ pu}$ $P_2 = -4 \text{ pu}$, $Q_2 = -2.5 \text{ pu}$	V_2 , δ_2
3	Bus de contrôle	$P_3 = 2 \text{ pu}$, $ V_3 = 1.04 \text{ pu}$	Q_3 , δ_3

Matrice d'admittances :

	1	2	3
1	$20 - j50$	$-10 + j20$	$-10 + j30$
2	$-10 + j20$	$26 - j52$	$-16 + j32$
3	$-10 + j30$	$-16 + j32$	$26 - j62$

$$V_k = \frac{1}{Y_{kk}} \left(\frac{P_k - jQ_k}{\text{conj}(V_k)} - \sum_{n=1, n \neq k}^N V_n Y(k, n) \right)$$

Programme proposé :

%Matrice d'admittances

```
Y = [20 - 50i -10 + 20i -10 + 30i;  
     -10 + 20i 26 - 52i -16 + 32i;  
     -10 + 30i -16 + 32i 26 - 62i];
```

%Initialisations

```
V1=1.05;
```

```
S2=-4 - 2.5i;
```

```
P3=2;
```

```
V2=1;
```

```
V3=1.04;
```

%Tension du générateur de contrôle

```
V3cor=1.04;
```

```
for m = 1:10
```

```
    V2=1/Y(2,2)*[conj(S2)/conj(V2)-(V1*Y(2,1)+V3*Y(2,3))]
```

```
    Q3=imag(V3*conj(Y(3,1)*V1+Y(3,2)*V2+Y(3,3)*V3))
```

```
    S3=P3+i*Q3
```

```
    V3=1/Y(3,3)*[conj(S3)/conj(V3)-(V1*Y(3,1)+V2*Y(3,2))]
```

```
    V3=V3cor*exp(i*angle(V3));
```

```
end
```

```
disp([abs(V2) angle(V2)*180/pi()])
```

```
disp([abs(V3) angle(V3)*180/pi()])
```

%Puissances des bus

```
S1=V1*conj(Y(1,1)*V1+Y(1,2)*V2+Y(1,3)*V3)
```

```
S2=V2*conj(Y(2,1)*V1+Y(2,2)*V2+Y(2,3)*V3)
```

```
S3=V3*conj(Y(3,1)*V1+Y(3,2)*V2+Y(3,3)*V3)
```

%Consommation de la lignes 1-2

```
S12=V1*conj(Y(1,2)*(V2-V1))
```

```
S21=V2*conj(Y(2,1)*(V1-V2))
```

```
SL12=S12+S21
```

%Consommation de la lignes 1-3

```
S13=V1*conj(Y(1,3)*(V3-V1))
```

```
S31=V3*conj(Y(3,1)*(V1-V3))
```

```
SL13=S13+S31
```

%Consommation de la lignes 2-3

```
S23=V2*conj(Y(2,3)*(V3-V2))
```

```
S32=V3*conj(Y(3,2)*(V2-V3))
```

```
SL23=S23+S32
```

%Bilan de puissances des bus

```
S=S1+S2+S3
```

%Bilan de puissances des lignes

```
SL=SL12+SL13+SL23
```

%Bilan global

```
Sb=S-SL
```

Résultats :

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$$V2 = 0.970605 - 0.045701i$$

$$Q3 = 1.4614$$

$$S3 = 2.0000 + 1.4614i$$

$$V3 = 1.0400e+00 - 9.0453e-03i$$

9

$$V2 = 0.970604 - 0.045708i$$

$$Q3 = 1.4616$$

$$S3 = 2.0000 + 1.4616i$$

$$V3 = 1.0400e+00 - 9.0503e-03i$$

10

$$V2 = 0.970604 - 0.045710i$$

$$Q3 = 1.4617$$

$$S3 = 2.0000 + 1.4617i$$

$$V3 = 1.0400e+00 - 9.0524e-03i$$

11

$$V2 = 0.970604 - 0.045712i$$

$$Q3 = 1.4617$$

$$S3 = 2.0000 + 1.4617i$$

$$V3 = 1.0400e+00 - 9.0533e-03i$$

12

$$V2 = 0.970604 - 0.045712i$$

$$Q3 = 1.4618$$

$$S3 = 2.0000 + 1.4618i$$

$$V3 = 1.0400e+00 - 9.0536e-03i$$

13

$$V2 = 0.970604 - 0.045712i$$

$$Q3 = 1.4618$$

$$S3 = 2.0000 + 1.4618i$$

$$V3 = 1.0400e+00 - 9.0538e-03i$$

14

$$V2 = 0.970604 - 0.045712i$$

$$Q3 = 1.4618$$

$$S3 = 2.0000 + 1.4618i$$

$$V3 = 1.0400e+00 - 9.0538e-03i$$

15

$$V2 = 0.970604 - 0.045712i$$

$$Q3 = 1.4618$$

$$S3 = 2.0000 + 1.4618i$$

$$V3 = 1.0400e+00 - 9.0538e-03i$$

$$0.9717 - 2.6965$$

$$1.0400 - 0.4988$$

$$S1 = 2.1842 + 1.4085i$$

$$S2 = -4.0000 - 2.5000i$$

$$S3 = 2.0000 + 1.4618i$$

$$S12 = 1.7936 + 1.1873i$$

$$S21 = -1.7097 - 1.0195i$$

$$SL12 = 0.083934 + 0.167867i$$

$S_{13} = 0.3906 + 0.2212i$
 $S_{31} = -0.3888 - 0.2157i$
 $SL_{13} = 1.8276e-03 + 5.4829e-03i$
 $S_{23} = -2.2903 - 1.4805i$
 $S_{32} = 2.3888 + 1.6775i$
 $SL_{23} = 0.098467 + 0.196934i$
 $S = 0.1842 + 0.3703i$
 $SL = 0.1842 + 0.3703i$
 $S_b = -1.9984e-15 + 7.5495e-15i$

