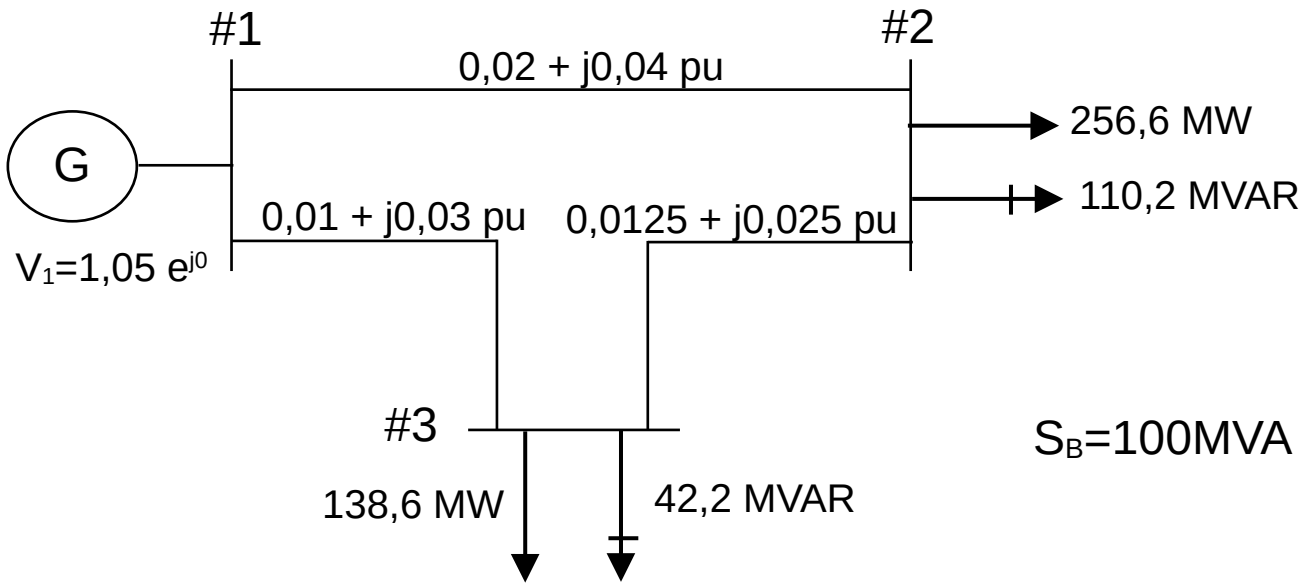


y12=(0,02 - j0,04)/(0,02² + 0,04²)=10 – j20 pu
y13= (0,01 - j0,03)/(0,01²+0,03²)=10 – j30 pu
y23=(0,0125 - j0,025)/(0,0125²+0,025²)=16 - j32 pu

Classification des bus :

Bus	Type	Valeurs connues	Valeurs inconnues
1	Slack bus	V1=1,05 pu, $\delta 1$=0	P1, Q1
2	Bus de charge	PL2=2,566pu, QL2=1,02pu P2=-2,566pu, Q2=-1,02pu	V2, $\delta 2$
3	Bus de charge	PL3=1,386pu, QL3=0,422pu P3=-1,386pu, Q2=-0,422pu	V3, $\delta 3$

Matrice d'addmittances :

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

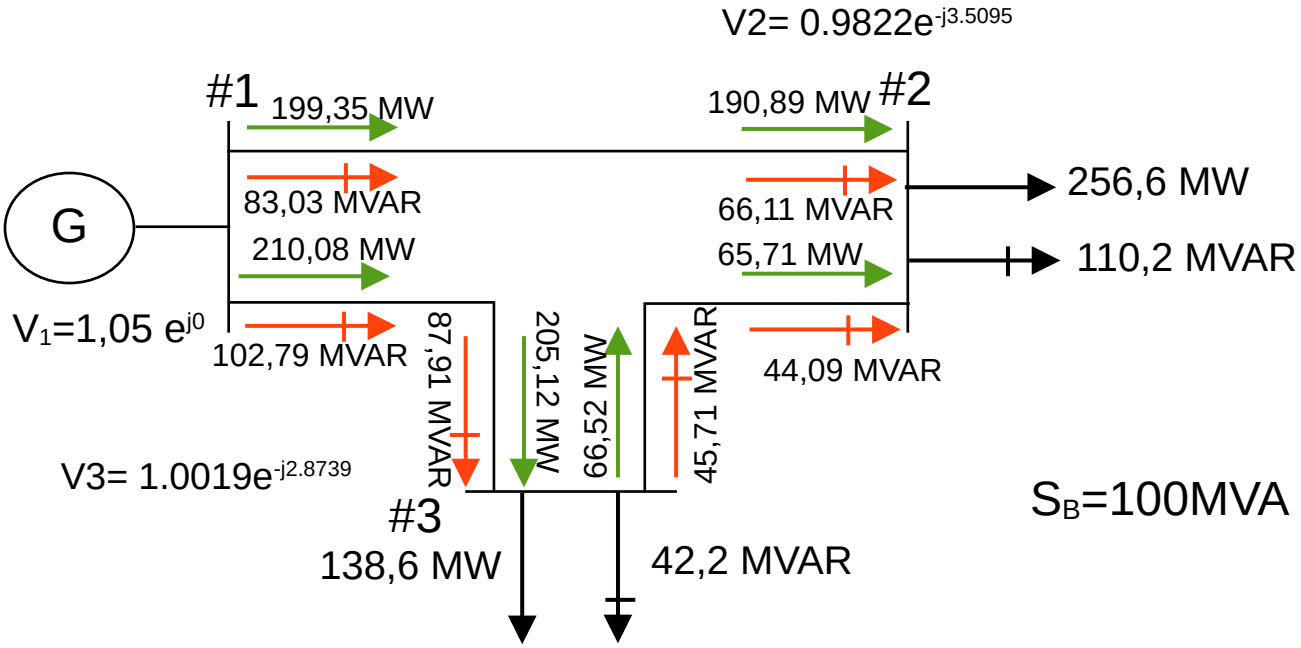
$$V_k = \frac{1}{Y_{kk}} \left(\frac{P_k - jQ_k}{V_k} - \sum_{n=1, n \neq k}^{N} V_k Y(k,n) \right)$$

Programme proposé :

```
%Matrice d'addmittances
Y = [20 - 50i -10 + 20i -10 + 30i;
    -10 + 20i  26 - 52i  -16 + 32i;
    -10 + 30i  -16 + 32i 26 - 62i];

%Initiaisations
V1=1.05;
S2=-2.566 - 1.102i;
S3=-1.386 - 0.422i;
V2=1;
V3=1;

for m = 1:10
  V2=1/Y(2,2)*[conj(S2)/conj(V2)-(V1*Y(2,1)+V3*Y(2,3))]
  V3=1/Y(3,3)*[conj(S3)/conj(V3)-(V1*Y(3,1)+V2*Y(3,2))]
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))
S121=S12+S21
%Consommation de la lignes 1-3
S13=V1*conj(Y(1,3)*(V3-V1))
S31=V3*conj(Y(3,1)*(V1-V3))
S131=S13+S31
%Consommation de la lignes 2-3
S23=V2*conj(Y(2,3)*(V3-V2))
S32=V3*conj(Y(3,2)*(V2-V3))
S232=S23+S32

%Bilan de puissnaces des bus
S=S1+S2+S3
%Bilan de puissnaces des lignes
SL=S121+S131+S232

%Bilan global
Sb=S-SL
```

Résultats :

V2 = 0.982538 - 0.031000i
V3 = 1.001516 - 0.035432i
V2 = 0.981862 - 0.052147i
V3 = 1.001358 - 0.046153i
V2 = 0.981129 - 0.057907i
V3 = 1.001006 - 0.049079i
V2 = 0.980724 - 0.059490i
V3 = 1.000797 - 0.049895i
V2 = 0.980535 - 0.059937i
V3 = 1.000697 - 0.050130i
V2 = 0.980453 - 0.060068i
V3 = 1.000654 - 0.050200i
V2 = 0.980419 - 0.060108i
V3 = 1.000635 - 0.050222i
V2 = 0.980405 - 0.060121i
V3 = 1.000628 - 0.050229i
V2 = 0.980400 - 0.060125i
V3 = 1.000625 - 0.050232i
V2 = 0.980398 - 0.060127i
V3 = 1.000624 - 0.050233i
0.9822 -3.5095
1.0019 -2.8739
S1 = 4.0943 + 1.8582i
S2 = -2.5659 - 1.1020i
S3 = -1.3860 - 0.4220i
S12 = 1.9935 + 0.8303i
S21 = -1.9089 - 0.6611i
S121 = 0.084597 + 0.169194i
S13 = 2.1008 + 1.0279i
S31 = -2.0512 - 0.8791i
S131 = 0.049614 + 0.148841i
S23 = -0.6571 - 0.4408i
S32 = 0.6652 + 0.4571i
S232 = 8.1116e-03 + 1.6223e-02i
S = 0.1423 + 0.3343i
SL = 0.1423 + 0.3343i
Sb = -2.1094e-15 – 3.7748e-15i



L12 : 0,02 + j0,04 pu

L13 : 0,01 + j0,03 pu

L23 : 0,0125 + j0,025 pu