FORMATION OF BUS ADMITTANCE MATRICES

EXP.NO : 2(a)

AIM:

To determine the admittance matrices for the given power system network

SOFTWARE REQUIRED: MATLAB/MIPOWER

THEORY:

Bus admittance is often used in power system studies. In most of the power system studies it is required to form y- bus matrix of the system by considering certain power system parameters depending upon the type of analysis. Y-bus may be formed by inspection method only if there is no mutual coupling between the lines.

Every transmission line should be represented by equivalent. Shunt impedances are added to diagonal element corresponding to the buses at which these are connected. The off diagonal elements are unaffected. The equivalent circuit of Tap changing transformers is included while forming Y-bus matrix

FORMATION OF Y-BUS MATRIX

Generalised Y-bus $= \begin{pmatrix} y_{ii} \ldots\ldots\ldots y_{id} \\ y_{di} \ldots\ldots\ldots y_{dd} \end{pmatrix}$

where, Y_{ii} = Self admittance

Y_{di} = Transfer admittance

PROCEDURE :

1. Enter the command window of the MATLAB.
2. Create a new M – file by selecting File - New – M – File
3. Type and save the program.
4. Execute the program by either pressing Tools – Run.

EXERCISES :

(i) Determine the Y bus matrix and Z bus matrix for the power system network shown in fig.

(ii) Check the results obtained in using MATLAB.

Develop a program to obtain bus admittance matrix Y-bus of the given

power system. Use any suitable assumptions.

Line Number	Starting Bus	Ending Bus	Series Line Impedance	Line Changing Admittance
1	**1**	**2**	**0.1+0.3j**	**0.02j**
2	**2**	**3**	**0.15+0.5j**	**0.0125j**
3	**3**	**1**	**0.2+0.6j**	**0.028j**

PROGRAM :

```
%Formation of Admittance Bus Matrix
nb=input('enter the no of buses');
nl=input('enter the no of lines');
disp('');
for i=1:nl
    disp('enter the details of the lines');
    sb(i)=input('enter the starting bus no');
    eb(i)=input('enter the ending bus no');
    seriesz(i)=input('enter the value of series impedance of the bus');
    shunty(i)=input('enter the value of shunt admittance of the bus');
    disp('');
end
ybus=zeros(nb,nb);
%calculation
for i=1:nl
    seriesy(i)=1/seriesz(i);
    a=sb(i);
    b=eb(i);
    ybus(a,a)=ybus(a,a)+seriesy(i)+shunty(i);
    ybus(b,b)=ybus(b,b)+seriesy(i)+shunty(i);
    ybus(a,b)=ybus(a,b)-seriesy(i);
    ybus(b,a)=ybus(b,a)-seriesy(i);
     end
    %output display
    ybus
```

Procedure to enter data for performing studies using Mipower:

1. Draw single line diagram and enter data simultaneously in database manager.
2. Open power system network editor. Select menu option Database-configure. Configure database dialog box is popped up. Click browse button.
3. The elements can be selected from the power system tool bar.
4. The element ID can be selected by double click the element in the file. Enter the details of the elements in detailed form.
5. Save and close the library screen.
6. To solve bus admittance matrix choose menu option solve-Ybus and Zbus.
7. Enter the number of buses and number of lines.
8. Enter details of buses and line values.
8. Click execute and Ybus will be executed.
9. Click on report to view the report.

Result: The results obtained for ybus using Mipower software was verified.

RESULT :

Thus the admittance matrix for the given power system network was determined.