NAME – ASHISH PANDEY (Reg No – 20225015)

EXPERIMENT NO -2

ZBUS FORMATION

PROGRAM CODE :

```
clc
clear all
close all
linedata= [0 1 0.02 0.05;
0 2 0.04 0.075;
1 2 0.2 0.75;
1 3 0.05 0.30;
2 3 0.06 0.45];
nl = linedata(:,1);
nr = linedata(:,2);
R = linedata(:,3);
X = linedata(:,4);
nbr=length(linedata(:,1));
nbus = max(max(nl), max(nr));
ZB = R + j*X;
Zbus = zeros(nbus, nbus);
tree=0; %%%%new
% Adding a branch from a new bus to reference bus 0
for I = 1:nbr
ntree(I) = 1;
        if nl(I) == 0 | nr(I) == 0
                if nl(I) == 0
                        n = nr(I);
                elseif nr(I) == 0
                        n = nl(I);
        end
                if abs(Zbus(n, n)) == 0
                        Zbus(n,n) = ZB(I);
                        tree=tree+1;%%new
        end
```

```
                ntree(I) = 2;
        end
end
% Adding a branch from new bus to an existing bus
while tree < nbus %%% new
        for n = 1:nbus
                nadd = 1;
                if abs(Zbus(n,n)) == 0
                        for I = 1:nbr
                                if nadd == 1;
                                        if nl(I) == n | nr(I) == n
                                                if nl(I) == n
                                                        k = nr(I);
                                                elseif nr(I) == n
                                                        k = nl(I);
                                                end
                                                if abs(Zbus(k,k)) ~= 0
                                                        for m = 1:nbus
                                                                if m ~= n
                                                                        Zbus(m,n) = Zbus(m,k);
                                                                        Zbus(n,m) = Zbus(m,k);
                                                                else,
                                                                end
                                                        end
                                                        Zbus(n,n) = Zbus(k,k) + ZB(I);
                                                        tree=tree+1; %%new
                                                        nadd = 2;
                                                        ntree(I) = 2;
                                                else
                                                end
                                        else
                                        end
                                else
                                end
```

```
                end
            else
            end
        end
        end
%%%%%%new
% Adding a link between two old buses
for n = 1:nbus
    for I = 1:nbr
        if ntree(I) == 1
            if nl(I) == n | nr(I) == n
                if nl(I) == n
                    k = nr(I);
                elseif nr(I) == n
                    k = nl(I);
                end
            DM = Zbus(n,n) + Zbus(k,k) + ZB(I) - 2*Zbus(n,k);
                for jj = 1:nbus
                AP = Zbus(jj,n) - Zbus(jj,k);
                    for kk = 1:nbus
                    AT = Zbus(n,kk) - Zbus(k, kk);
                    DELZ(jj,kk) = AP*AT/DM;
                    end
                end
                Zbus = Zbus - DELZ;
                ntree(I) = 2;
            else,
    end
        else,
    end
        end
    end
Zbus
```

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RESULT :

Command Window

```
Zbus =

   0.0174 + 0.0451i   0.0050 + 0.0073i   0.0121 + 0.0300i
   0.0050 + 0.0073i   0.0309 + 0.0645i   0.0158 + 0.0300i
   0.0121 + 0.0300i   0.0158 + 0.0300i   0.0412 + 0.2100i

fx >>
```