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Course Title: Power System Analysis **Course Code: BTEEC501**
Class: Third Year **Semester: V**

EXPERIMENT NO. 1

AIM: - Determine the symmetrical components of the following system using phase components using MATLAB

Ia= -0.143- 0.787 j , Ib= 0+2.5 j , Ic= -0.0233 + 0.79966 j
Va= 12.4450 + 12.4450 j;   Vb= -7.5392 - 3.3252 j;   Vc= 3.7905 - 4.1221 j

APPARATUS: - MATLAB

MATLAB PROGRAMMING:-

```
Ia=-0.143-0.787j
Ib=0+2.5j
Ic=-0.0233+0.79966j

A=-0.5+0.866j

Ia0=(1/3)*(Ia+Ib+Ic)
Ia1=(1/3)*(Ia+A*Ib+(A^2)*Ic)
Ia2=(1/3)*(Ia+(A^2)*Ib+A*Ic)

Ib0=Ia0
Ib1=(A^2)*Ia1
Ib2=A*Ia2

Ic0=Ia0
Ic1=A*Ia1
Ic2=(A^2)*Ia2
```

RESULT: - Ia0 = ; Ia1= ; Ia2 = ; Ib0 =   ; Ib1 = ; Ib2 = ; Ic0 = ; Ic1 = ; Ic2 =

CONCLUSION:-

EXPEIMENT NO.2

AIM: - Determine the phase components of the following system using symmetrical components using MATLAB

Ia1= - 0.143-0.787j;   Ia2=0+2.5j;   Ia0= - 0.0233+0.79966j

Va1= 12.4450 + 12.4450j;   Va2= -7.5392 - 3.3252j;   Va0= 3.7905 - 4.1221j

APPARATUS: - MATLAB

MATLAB PROGRAMMING:-

```
Ia1=-0.143-0.787j
Ia2=0+2.5j
Ia0=-0.0233+0.79966j
A=-0.5+0.866j
Ia=Ia0+Ia1+Ia2
Ib=Ia0+(A^2)*Ia1+A*Ia2
Ic=Ia0+A*Ia1+(A^2)*Ia2
Va1=12.4450+12.4450j
Va2=-7.5392-3.3252j
Va0=3.7905-4.1221j
A=-0.5+0.866j
Va=Va0+Va1+Va2
Vb=Va0+(A^2)*Va1+A*Va2
Vc=Va0+A*Va1+(A^2)*Va2
```

RESULT: - Ia =   ; Ib =   ; Ic = ; Va= ; Vb = ; Vc =

CONCLUSION:-

EXPERIMENT NO.3

AIM: - A 25MVA, 11kV, 3 phase alternator has direct axis sub-transient reactance of 0.25 per unit, negative sequence reactance and zero sequences are respectively 0.35 and 0.1p.u. Neutral of the generator is solidly grounded. Determine fault currents for Single line to ground fault using MATLAB

APPARATUS: - MATLAB

THEORY:-

MATLAB PROGRAMMING

```
Xn=0
Xg0=0.1j
X1=0.25j
X2=0.35j
A=-0.5+0.866j

X0=Xg0+3*Xn

Ia0=Ea/(Xg0+X1+X2)
Ia1=Ia0
Ia2=Ia0
Ia=Ia0+Ia1+Ia2

Ibase=25*10^6/(sqrt(3)*11*10^3)
Ifault=Ia*Ibase
```

RESULT: - Fault Current in Amperes (I_F) =

CONCLUSION:-

EXPEIMENT NO.4

AIM: - A 25MVA, 11kV, 3 phase alternator has direct axis sub-transient reactance of 0.25 per unit, negative sequence reactance and zero sequences are respectively 0.35 and 0.1p.u. Neutral of the generator is solidly grounded. Determine fault currents for line to line fault using MATLAB

APPARATUS: - MATLAB

MATLAB PROGRAMMING:-

```
Ea=1+0j

 d9='Ea(actual)=11*10^3/sqrt(3);';
 disp(d9);
 Ia2=Ea/(X1+X2)
 Ia1=-Ia2

 d10='ia0=0. Line to line fault does not involve ground. Hence In=0 & Ia=0';
disp(d10);
Ia0=0
Ia=Ia0+Ia1+Ia2
Ib=Ia0+(A^2)*Ia1+A*Ia2
Ic=-Ib

Ibase=25*10^6/(sqrt(3)*11*10^3)
IB=Ib*Ibase
IC=Ic*Ibase
```

RESULT: - Fault Current in Amperes (I_F) =

CONCLUSION:-

EXPERIMENT NO.5

AIM: - A 25MVA, 11kV, 3 phase alternator has direct axis sub-transient reactance of 0.25 per unit, negative sequence reactance and zero sequences are respectively 0.35 and 0.1p.u. Neutral of the generator is solidly grounded.
Determine fault currents for Double line to ground fault using MATLAB

APPARATUS: - MATLAB

THEORY:-

MATLAB PROGRAMMING

```
Xn=0
Xg0=0.1j
X1=0.25j
X2=0.35j
A=-0.5+0.866j

X0=Xg0+3*Xn
a=(X2*X0)/(X2+X0)

Ia1=(Ea/a)

Ibase=25*10^6/(sqrt(3)*11*10^3)
Ifault=Ia1*1.732*Ibase
```

RESULT: - Fault Current in Amperes (I_F) =

CONCLUSION:-

EXPERIMENT NO.6

AIM: - A 25MVA, 11kV, 3 phase alternator has direct axis sub-transient reactance of 0.25 per unit, negative sequence reactance and zero sequences are respectively 0.35 and 0.1p.u. Neutral of the generator is solidly grounded.
Determine Sub Transient currents for Three Phase fault using MATLAB

APPARATUS: - MATLAB

THEORY:-

MATLAB PROGRAMMING

```
Xn=0
Xg0=0.1j
X1=0.25j
X2=0.35j
A=-0.5+0.866j

Ia1= (Ea/X1)

Ibase=25*10^6/ (sqrt (3)*11*10^3)
Ia1 (Amps) =Ia1*1.732*Ibase
```

RESULT: - Sub Transient Current in Amperes ($Ia1$) =

CONCLUSION:-

EXPERIMENT NO.7

AIM: - Determine the Voltage phase components of the following system using symmetrical components using MATLAB

Va1= 12.4450 + 12.4450j;   Va2= -7.5392 - 3.3252j;   Va0= 3.7905 - 4.1221j

APPARATUS: - MATLAB

MATLAB PROGRAMMING:-

```
Va1=12.4450+12.4450j
Va2=-7.5392-3.3252j
Va0=3.7905-4.1221j
A=-0.5+0.866j
Va=Va0+Va1+Va2
Vb=Va0+(A^2)*Va1+A*Va2
Vc=Va0+A*Va1+(A^2)*Va2
```

RESULT: - Va=; Vb =; Vc =

CONCLUSION:-

EXPERINMENT NO. 8

AIM: - Determine the symmetrical components of the following system using phase components using MATLAB

Va= 12.4450 + 12.4450 j;   Vb= -7.5392 - 3.3252 j;   Vc= 3.7905 - 4.1221 j

APPARATUS: - MATLAB

MATLAB PROGRAMMING:-

```
A= -0.5+0.866j

Va0 = (1/3)*(Va+Vb+Vc)
Va1 = (1/3)*(Va+A*Vb+(A^2)*Vc)
Va2 = (1/3)*(Va+(A^2)*Vb+A*Vc)
```

RESULT: - Va0 =; Va1=; Va2 =;

CONCLUSION:-