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Roll No. 26

EXPERIMENT No.3

Computation of Transmission Line Parameters: ABCD parameters

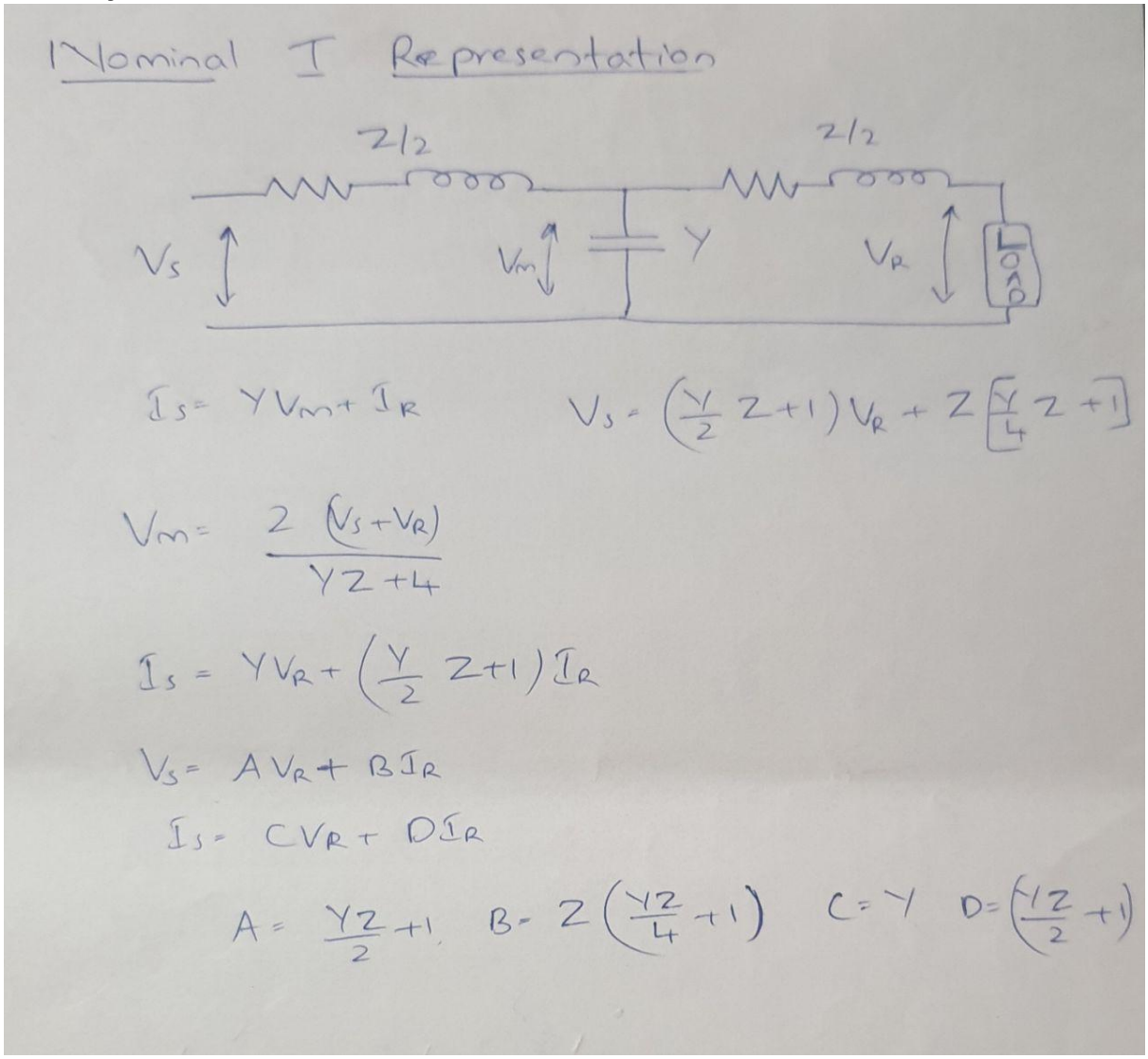
Aim

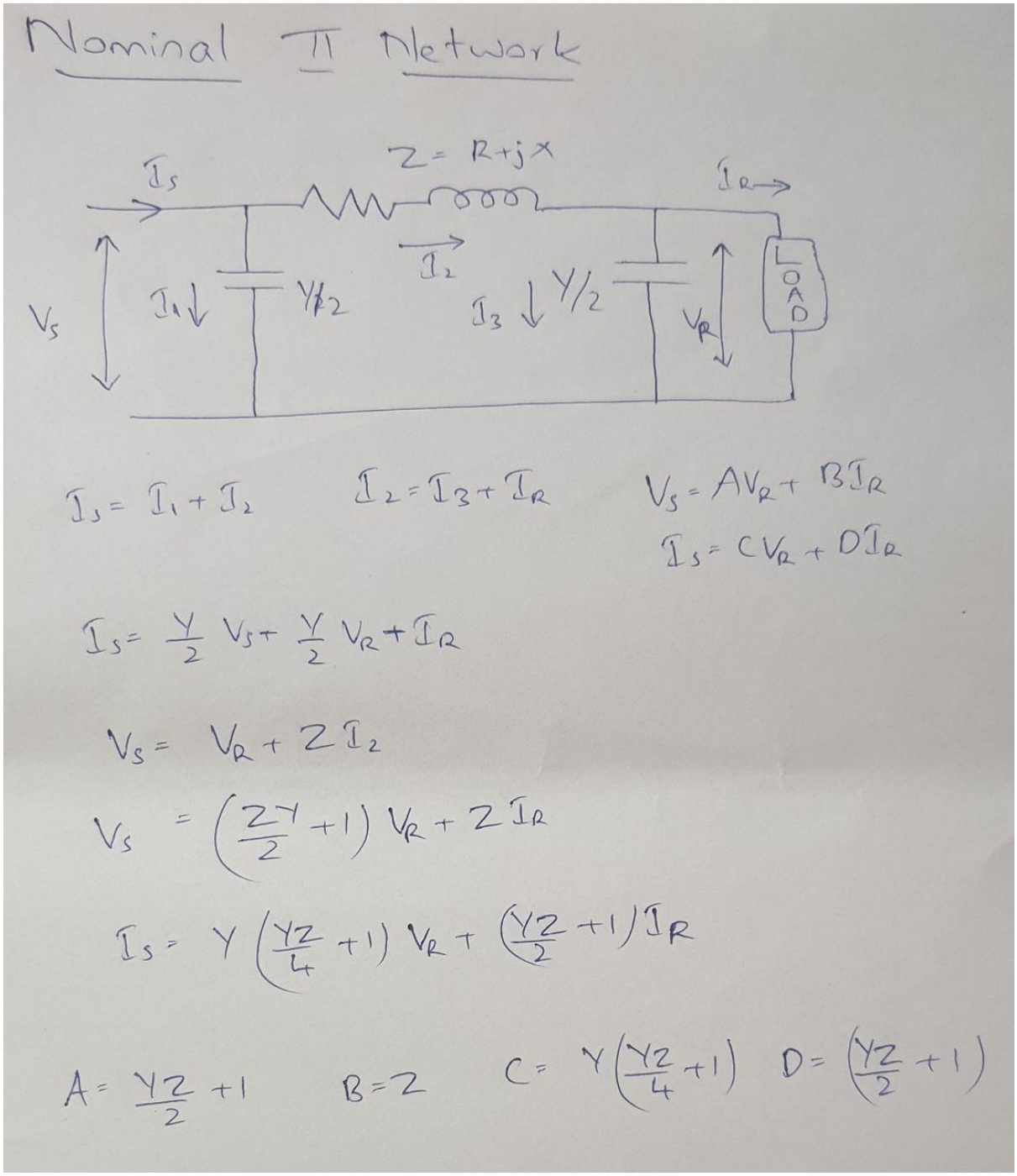
To compute the ABCD parameters of given nominal T and nominal Pi model transmission line.

Software Platform

Scilab

Theory





Program

Problem 1

A balanced 3-phase load of 30 MW is supplied at 132 KV, 50 Hz and 0.85 pf lagging by needs of a transmission line. The series impedance of a single conductor is (20+j52) ohms and the total phase neutral admittance is 315×10^{-6} Siemen. Using nominal T method determine Transmission line ABCD-parameters and the regulation of the line.

Problem 2

A 3 phase, 50 Hz, 100 Km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1Ω/Km,0.2Ω/Km and $4x10^{-6}$ S/Km per phase. If the line delivers 10 MW at 110 KV and 0.8 pf lagging, determine the transmission line ABCD-parameters and the regulation of the line using nominal-pi method.

Sample Program (All)

```
clc;
clear;

model=input("Enter 0 for T model and 1 for Pi model:")
rkm=input("Enter series resistance per km:")
lkm=input("Enter series reactance per km(with *%i):")
ykm=input("Enter shunt admittance per km(with *%i):")
distance=input("Enter the length in km:")

r=distance*rkm
l=distance*lkm
y=distance*ykm

z=r+l
temp=z*y/2
a=temp+1
d=a

if model==0 then
b=z*(1+(temp/2))
c=y
elseif model==1 then
c=y*(1+(temp/2))
b=z
end

disp('The values of ABCD parameters are ')
disp('A = ',a)
disp('B = ',b)
disp('C = ',c)
disp('D = ',d)
```

Sample Output – 1

```
Enter 0 for T model and 1 for Pi model:0
Enter series resistance per km:20
Enter series reactance per km(with *%i):52*%i
Enter shunt admittance per km(with *%i):315*10^-6*%i
Enter the length in km:1
  "The values of ABCD parameters are "
  "A = " 0.99181 + 0.00315i
  "B = " 19.8362 + 51.81856i
  "C = " 0. + 0.000315i
  "D = " 0.99181 + 0.00315i
```

Sample Output – 2

```
Enter 0 for T model and 1 for Pi model:1
Enter series resistance per km:0.1
Enter series reactance per km(with *%i):0.2*%i
Enter shunt admittance per km(with *%i):4*10^-6*%i
Enter the length in km:100
  "The values of ABCD parameters are "
  "A = " 0.996 + 0.002i
  "B = " 10. + 20.i
  "C = " -0.0000004 + 0.0003992i
  "D = " 0.996 + 0.002i
```

Result

ABCD parameters of given nominal T and nominal Pi model transmission lines were calculated using Scilab and verified.