Appendices

Appendix -I

Program for Finding out the Crack Location (e) and Crack Size (a/h) For Simply Supported Beam in Transverse Vibration.

```c
#include <stdio.h>
#include <math.h>
#include <conio.h>
#define pi 3.1415
int main(void)
{

char c='y';

double e,uf1,uf2,cf1,cf2,df1,df2,temp,h,l,test,p;
do
{
	clrscr();

printf("Enter The Values of First Natural Frequency of Uncracked Simply supported Beam uf1 = ");
scanf("%lf",&uf1);
printf("Enter The Values of Second Natural Frequency of Uncracked Simply supported Beam uf2= ");
scanf("%lf",&uf2);
printf("Enter The Values of First Natural Frequency of Cracked Simply supported Beam cf1 = ");
scanf("%lf",&cf1);
```
printf("\nEnter The Values of Second Natural Frequency of Cracked Simply
 supported Beam cf2 = ");

scanf("%lf", &cf2);

printf("\nEnter The Values of Depth of the Beam h = ");

scanf("%lf", &h);

printf("\nEnter The Values of Length of the Beam l = ");

scanf("%lf", &l);

df1 = uf1 - cf1;
df2 = uf2 - cf2;

temp = ((df2/uf2) / (df1/uf1)) / 2 ;

e = (acos(1-temp))/pi;

printf("\nThe crack location is 'e' = %lf", e);

temp = df1/uf1;
test = sin(pi * (e+1)/2.0);
test = test*test;
p = sqrt(temp / (9.9563*test* h/l));

printf("\nThe crack size is 'a/h' = %lf", p);

printf("\nDo you want to continue(y/n) ");

c = getche();
}while(c=='y' || c == 'Y');

c = getch();
return 0;
}
Appendices

Appendix -II

Program for Finding out the Crack Location (e) and Crack Size (a/h) for Cantilever Beam in Transverse Vibration.

```c
#include <stdio.h>
#include <math.h>
#include <conio.h>
#define pi 3.1415
int main(void)
{
    char c='y';
    double e,uf1,uf2,cf1,cf2,df1,df2,temp,x,h,l,test,p;
    do
    {
        clrscr();
        printf("Enter The Values of First Natural Frequency of Uncracked Cantilever Beam uf1 = ");
        scanf("%lf",&uf1);
        printf("Enter The Values of Second Natural Frequency of Uncracked Cantilever Beam uf2= ");
        scanf("%lf",&uf2);
        printf("Enter The Values of First Natural Frequency of Cracked Cantilever Beam cf1 = ");
        scanf("%lf",&cf1);
```
printf("\nEnter The Values of Second Natural Frequency of Cracked
   Cantilever Beam cf2 = ");

scanf("%lf",&cf2);

printf("\nEnter The Values of Depth of the Beam h = ");

scanf("%lf",&h);

printf("\nEnter The Values of Length of the Beam l = ");

scanf("%lf",&l);

df1 = uf1 - cf1;
df2 = uf2 - cf2;

temp = (df1/uf1) (df1/uf1);
e = 0;

while (e <= 1)
{
    x = (temp*(-4.9362*e^3-3.7554*e^2+0.2146*e-1.5))+(15.5*e^3-23.25*e^2+9.8*e-1.02);
    if (x == 0)
    {
        printf("\nThe crack location is 'e' = %lf",e);
    }
    e = e + 0.01;
}

temp = df1/uf1;
test = sin(pi * (e)/2.0);
test = test*test;

p = sqrt(temp / (9.9563*test* h/l));

printf("\nThe crack size is 'a/h' = %lf",p);

printf("\n\nDo you want to continue(y/n)"nten);c = getche();

}while(c=='y' || c == 'Y');

getch();

return 0;

}
Appendices

Appendix -III

Program for Finding out the Crack Location (e) and Crack Size (a/h) For Cantilever Beam in Longitudinal Vibration.

#include <stdio.h>
#include <math.h>
#include <conio.h>
#define pi 3.1415

int main(void)
{
    char c='y';

double e, ufa1, ufa2, cfa1, cfa2, dfa1, dfa2, temp, temp1, h, l, test, p;

do
{
    clrscr();

    printf("Enter The Values of First Axial Natural Frequency of Uncracked Cantilever Beam ufa1 = ");
    scanf("%lf",&ufa1);

    printf("Enter The Values of Second Axial Natural Frequency of Uncracked Cantilever Beam ufa2= ");
    scanf("%lf",&ufa2);

    printf("Enter The Values of First Axial Natural Frequency of Cracked Cantilever Beam cfa1 = ");
    scanf("%lf",&cfa1);
printf("Enter The Values of Second Axial Natural Frequency of Cracked
         Cantilever Beam cfa2 = ");
scanf("%lf",&cfa2);
printf("Enter The Values of Depth of the Beam h = ");
scanf("%lf",&h);
printf("Enter The Values of Length of the Beam l = ");
scanf("%lf",&l);
dfa1 = ufa1 - cfa1;
dfa2 = ufa2 - cfa2;
temp = ((dfa2/ufa2) / (dfa1/ufa1));
temp1 = (sqrt(temp)-1)/2;
e = (asin(temp1))/pi;
printf("The crack location is 'e' = %lf",e);
temp = dfa1/ufa1;
test = sin(1/2*pi * (e+1)/2.0);
test = test*test;
p = sqrt(temp / (9.9563*test* h/l));
printf("The crack size is 'a/h' = %lf",p);
printf("\nDo you want to continue(y/n)");
c = getche();
} while(c=='y' || c == 'Y');
getch();
return 0;
Appendices

Appendix -IV

Program for Finding out the Crack Location (e) and Crack Size (a/h) For Simply Supported Beam or Free-Free Beam in Longitudinal Vibration.

```c
#include <stdio.h>
#include <math.h>
#include <conio.h>
#define pi 3.1415
int main(void)
{
    char c='y';
    double e,ufa1,ufa2,cfa1,cfa2,dfa1,dfa2,temp,h,l,test,p;
    do
    {
        clrscr();
        printf("Enter The Values of First Axial Natural Frequency of Uncracked Simply supported or Free Free Beam ufa1 = ");
        scanf("%lf",&ufa1);
        printf("Enter The Values of Second Natural Frequency of Uncracked Simply supported or Free Free Beam ufa2= ");
        scanf("%lf",&ufa2);
        printf("Enter The Values of First Natural Frequency of Cracked Simply supported or Free Free Beam cfa1 = ");
        scanf("%lf",&cfa1);
        printf("Enter The Values of Second Natural Frequency of Cracked Simply supported or Free Free Beam cfa2 = ");
        scanf("%lf",&cfa2);
        break;
    }
    while(c=='y');
```

```c
    // Additional code for finding location and size
    // of the crack
```

```c
```
scanf("%lf",&cfa1);
printf("Enter The Values of Second Natural Frequency of Cracked Simply
supported or Free Free Beam cfa2 = ");
scanf("%lf",&cfa2);
printf("Enter The Values of Depth of the Beam h = ");
scanf("%lf",&h);
printf("Enter The Values of Length of the Beam l = ");
scanf("%lf",&l);
dfa1 = ufa1 - cfa1;
dfa2 = ufa2 - cfa2;
temp = (dfa2/ufa2) / (dfa1/ufa1) / 2 ;
e = (acos(1-temp))/pi;
printf("The crack location is 'e' = %lf",e);
temp = dfa1/ufa1;
test = sin(pi * (e+1)/2.0);
test = test*test;
p = sqrt(temp / (9.9563*test* h/l));
printf("The crack size is 'a/h' = %lf",p);
printf("Do you want to continue(y/n)");
c = getche();
} while(c=='y' || c == 'Y');
getch();
return 0;
PUBLICATION RESULTING FROM THE THESIS


