PHỤ LỤC

Sau đây là 22 chương trình soạn theo ngôn ngữ Turbo Pascal 7.0

1. Chương trình **CTR1**: Bài toán một chiều dùng phương pháp loại trừ
2. Chương trình **CTR2**: Bài toán một chiều dùng phương pháp mô hình lò xo
3. Chương trình **CTR3**: Bài toán một chiều kiểu hàm hình dạng bậc hai
4. Chương trình **CTR4**: Tính giàn phẳng
5. Chương trình **CTR5**: Tính giàn không gian
6. Chương trình **CTR6**: Tính giàn phẳng chịu tác dụng của nhiệt độ
7. Chương trình **CTR7**: Tính giàn phẳng chế tạo không chính xác
8. Chương trình **CTR8**: Bài toán 2 chiều kiểu phần tử hữu hạn tam giác biến dạng không đổi.
9. Chương trình **CTR9**: Tính gần đúng vật rắn tròn xoay chịu tải trọng đối xứng
10. Chương trình **CTR10**: Tính dầm liên tục trên gối tựa thông thường
11. Chương trình **CTR11**: Tính dầm liên tục trên gối tựa đàn hồi
12. Chương trình **CTR12**: Tính dầm liên tục trên gối tựa lún theo phương pháp mô hình lò xo.
13. Chương trình **CTR13**: Giải gần đúng bài toán ứng suất phẳng kiểu FTHH 4 cạnh 4 nút.
14. Chương trình **CTR14**: Tính khung phẳng trên gối tựa thường và gối tựa đàn hồi.
15. Chương trình **CTR15**: Tính khung phẳng trên gối tựa lún theo phương pháp mô hình lò xo.
16. Chương trình **CTR16**: Tính hệ dầm trực giao
17. Chương trình **CTR17**: Giải bài toán 3 chiều kiểu FTHH 4 mặt 4 nút
18. Chương trình **CTR18**: Tính khung không gian
19. Chương trình **CTR19**: Tính giá trị riêng lớn nhất cho hệ giàn
20. Chương trình **CTR20**: Tính giá trị riêng bé nhất cho hệ giàn
21. Chương trình **CTR21**: Tính giá trị riêng lớn nhất cho hệ khung
22. Chương trình **CTR22**: Tính giá trị riêng bé nhất cho hệ khung

```
Program CTR1_Bai_toan_mot_chieu_dung_ff_loai_tru;
Uses crt;
type  mt1= array[1..20,1..20] of real; mt2=array[1..20] of real;
    mt3= array[1..20] of integer;
Var  i,j,k,n,x,ss,tbt,st,sbt,rr,y:integer; a,d1,d2,u:mt3;
    c1,c2,c3,c4,c5,c6,cv,f,fc,fe,fl,fn,t,cd,dt,e,tg,qq,us,qc,b:mt2;
    s,sc,sr:mt1;
    al,del,q,r,tt:real;

 Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var    i,j,k,s:integer; q,r:real ;
begin
 (*Khu dan cac fan tu cua ma tran*);
    s:=0;
 REPEAT
    s:=s+1;
    for i:= s+1 to n do
     Begin
      if(a[s,s]<>0) then
      q:=a[s,i]/a[s,s];
      for j:=i to n do
       a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
     End
 UNTIL(s= n -1);
 x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
   Begin
     r :=0;
     for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
     if(a[i,i]<>0) then
     x[i]:= (b[i]-r)/ a[i,i];
   End;
end;
Begin    clrscr;

(*Nguoi lap trinh :Vo nhu Cau*);
writeln('nhap tong so  BTD');
readln(tbt);
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('nhap so BTD co chuyen vi triet tieu');
readln(y);
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writeln('nhap so thu tu  BTD co chuyen vi triet tieu');
if (y<>0) then for i:=1 to y do
readln(u[i]);
writeln('nhap chieu dai ');
for i:=1 to st do  readln(cd[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap ti trong');
readln(tt);
writeln('nhap cuong do luc bien');
for i:=1 to st do  readln(t[i]);
writeln('nhap he so gian no');
readln(al);
writeln('nhap so gia mhiet do');
readln(del);
writeln('nhap cac thanh fan ngoai luc');
for i:=1 to tbt do  readln(fn[i]);

(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to st do
begin
c1[i]:=dt[i]*e[i]/cd[i];
s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
s[d1[i],d2[i]]:=s[d1[i],d2[i]]-c1[i];
s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c1[i];
end;
for i:=1 to tbt do
for j:=1 to i-1 do    s[i,j]:=s[j,i];
(*Ghep cac vecto tai trong*);
for i:=1 to st do
begin
c2[i]:=dt[i]*cd[i]*tt/2;  c3[i]:=t[i]*cd[i]/2; c4[i]:=e[i]*dt[i]*al*del;
c5[i]:=c2[i]+c3[i]-c4[i];  c6[i]:=c2[i]+c3[i]+c4[i];
f[d1[i]]:=f[d1[i]]+c5[i];  f[d2[i]]:=f[d2[i]]+c6[i];
end;
for i:=1 to tbt do     f[i]:=f[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);
```

```
(*Tnh ung suat*);
if(y<>0) then for i:=1 to y do qq[u[i]]:=0;
for i:=1 to st do
us[i]:=(e[i]/cd[i])*(qq[d2[i]]-qq[d1[i]]);

(*Tnh fan luc*);
 rr:=sbt+1;
 for j:=1 to sbt do
 for i:=rr to tbt do     sr[i,j]:=s[i,j];
 for i:= rr to tbt do
 begin
  fl[i]:=0; for k:=1 to sbt do  fl[i]:= fl[i]+sr[i,k]*qq[k]-f[i];
 end;

(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln('gia tri ung suat');
for i:=1 to st do
writeln(us[i]);
writeln('gia tri fan luc');
for i:=rr to tbt do
writeln(fl[i]);
readln;
end.
```

```
Program CTR2_Bai_toan_mot_chieu_dung_ff_mo_hinh_lo_xo;
Uses crt;
type mt1=array[1..20,1..20] of real;  mt2=array[1..20] of real;
   mt3=array[1..20] of integer;
Var  i,j,k,n,x,ss,st,sbt,tbt,rr,y:integer; d1,d2,u:mt3;
    c1,c2,c3,c4,c5,c6,cv,f,fc,fe,fl,fn,t,cd,dt,e,tg,qq,us,max,a:mt2;
    ke,s,sc:mt1;
    al,del,q,r,c,maxx,tt:real;

procedure gtcdtd(a:mt1;n:integer);
begin
 max[i]:=abs(a[i,1]);
for i:=1 to n do
for j:=2 to n do
begin
if ((abs(a[i,j])>max[i]) or (abs(a[i,j])=max[i]))  then
 max[i]:=abs(a[i,j]) else max[i]:=max[i] ;
end;
 maxx:=max[1];
for i:=2 to n do
begin
 if(max[i]>maxx) then
 maxx:=max[i] else maxx:=maxx ;
end;
end;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var    i,j,k,s:integer; q,r:real ;
begin
 (*Khu dan cac fan tu cua ma tran*);
     s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
       Begin
         if(a[s,s]<>0) then
         q:=a[s,i]/a[s,s];
         for j:=i to n do
          a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
  UNTIL(s= n -1);
   x[n]:=b[n]/a[n,n];
   for i:= n -1  downto 1 do
      Begin
        r :=0;
```

```
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
      End;
  end;

  Begin    clrscr;
  (*Nguoi lap trinh :Vo nhu Cau*);
  writeln('nhap so thanh');
  readln(st);
  writeln('nhap so BTD co chuyen vi');
  readln(sbt);
  writeln('nhap tong so BTD ');
  readln(tbt);
  writeln('nhap so BTD co  chuyen vi cho truoc ');
  readln(y);
  writeln('nhap so thu tu BTD co  chuyen vi cho truoc ');
  if(y<>0) then for i:=1 to y do
  readln(u[i]);
  writeln('nhap  gia tri cac  chuyen vi cho truoc');
  if(y<>0) then for i:=1 to y do
  readln(a[i]);
  writeln('nhap chieu dai');
  for i:=1 to st do  readln(cd[i]);
  writeln('nhap dien tich');
  for i:=1 to st do  readln(dt[i]);
  writeln('nhap modun dan hoi');
  for i:=1 to st do  readln(e[i]);
  writeln('nhap BTD d1');
  for i:=1 to st do  readln(d1[i]);
  writeln('nhap BTD d2');
  for i:=1 to st do  readln(d2[i]);
  writeln('nhap ti trong');
  readln(tt);
  writeln('nhap cuong do luc bien');
  for i:=1 to st do  readln(t[i]);
  writeln('nhap he so gian no');
  readln(al);
  writeln('nhap so gia mhiet do');
  readln(del);
  writeln('nhap cac thanh fan ngoai luc');
  for i:=1 to tbt do  readln(fn[i]);
  (*Ghep cac MTDC rieng vao MTDC tong the*);
  for i:=1 to st do
```

```
begin
c1[i]:=dt[i]*e[i]/cd[i];
s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
s[d1[i],d2[i]]:=s[d1[i],d2[i]]-c1[i];
s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c1[i];
end;
for i:=1 to tbt do
for j:=1 to i-1 do    s[i,j]:=s[j,i];

(*Goi chuong trinh con de tinh GTTD max cua cac fan tu MT*);
GTCDTD(s,tbt);
 c:=(maxx)*10E+08;
 if(y<>0) then for i:=1 to y do     s[u[i],u[i]]:=s[u[i],u[i]]+c;
(*Ghep cac vecto tai trong*);
for i:=1 to st do
begin
c2[i]:=dt[i]*cd[i]*tt/2;  c3[i]:=t[i]*cd[i]/2; c4[i]:=e[i]*dt[i]*al*del;
c5[i]:=c2[i]+c3[i]-c4[i];  c6[i]:=c2[i]+c3[i]+c4[i];
f[d1[i]]:=f[d1[i]]+c5[i];  f[d2[i]]:=f[d2[i]]+c6[i];
end;
for i:=1 to tbt do     f[i]:=f[i]+fn[i];
if (y<>0) then for i:=1 to y do   f[u[i]]:=f[u[i]]+c*a[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,tbt);

(*Tnh ung suat*);
for i:=1 to st do
us[i]:=(e[i]/cd[i])*(qq[d2[i]]-qq[d1[i]]);

(*Tnh fan luc*);
if(y<>0) then for i:=1 to y do
fl[u[i]]:=-c*(qq[u[i]]-a[i]);

(*Doc ket qua*);
writeln('chuyen vi');
for i:=1 to tbt  do
writeln(qq[i]);
writeln('ung suat');
for i:=1 to st do
writeln(us[i]);
writeln('fan luc');
for i:=1 to y do
writeln(fl[u[i]]);
readln;
end.
```

```
Program CTR3_Bai_toan_mot_chieu_kieu_ham_hinh_dang_bac_hai;
Uses crt;
type  mt1= array[1..20,1..20] of real; mt2=array[1..20] of real;
      mt3= array[1..20] of integer;
Var  i,j,k,n,x,ss,tbt,st,sbt,rr,y:integer; a,d1,d2,d3,u:mt3;
     c1,c2,c3,c4,c5,c6,c7,f,fl,fn,cd,dt,e,qq,us1,us2,us3:mt2;
     s,sc,sr,ke:mt1; q,r,tt,t:real;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
(*Khu dan cac fan tu cua ma tran*);
    s:=0;
 REPEAT
    s:=s+1;
    for i:= s+1 to n do
     Begin
      if(a[s,s]<>0) then
      q:=a[s,i]/a[s,s];
      for j:=i to n do
       a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
     End
 UNTIL(s= n -1);
 x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
    Begin
       r :=0;
       for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
       if(a[i,i]<>0) then
       x[i]:= (b[i]-r)/ a[i,i];
    End;
end;

Begin     clrscr;
(*Nguoi lap trinh :Vo nhu Cau*);
writeln('nhap tong so BTD');
readln(tbt);
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('nhap so BTD co chuyen vi triet tieu');
readln(y);
writeln('nhap so thu tu  BTD co chuyen vi triet tieu');
```

```
if(y<>0) then for i:=1 to y do
readln(u[i]);
writeln('nhap chieu dai ');
for i:=1 to st do  readln(cd[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap BTD d3');
for i:=1 to st do  readln(d3[i]);
writeln('nhap ti trong');
readln(tt);
writeln('nhap cuong do  luc bien');
readln(t);
writeln('nhap cac thanh fan ngoai luc');
for i:=1 to tbt do  readln(fn[i]);

(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to st do
begin
c1[i]:=7*dt[i]*e[i]/(3*cd[i]);  c2[i]:=dt[i]*e[i]/(3*cd[i]);
c3[i]:=-8*dt[i]*e[i]/(3*cd[i]); c4[i]:=16*dt[i]*e[i]/(3*cd[i]);
s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c3[i];
s[d2[i],d1[i]]:=s[d2[i],d1[i]]+c2[i];
s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c1[i];
s[d2[i],d3[i]]:=s[d2[i],d3[i]]+c3[i];
s[d3[i],d1[i]]:=s[d3[i],d1[i]]+c3[i];
s[d3[i],d2[i]]:=s[d3[i],d2[i]]+c3[i];
s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c4[i];
end;
for i:=1 to sbt do
for j:=1 to i-1 do  s[i,j]:=s[j,i];

(*Ghep cac vecto tai trong*);
for i:=1 to st do
begin
c5[i]:=dt[i]*cd[i]*tt/6;  c6[i]:=t*cd[i]/6; c7[i]:=c5[i]+c6[i];
f[d1[i]]:=f[d1[i]]+c7[i];  f[d2[i]]:=f[d2[i]]+c7[i];
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f[d3[i]]:=f[d3[i]]+c7[i];
end;
for i:=1 to tbt do     f[i]:=f[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Tnh ung suat*);
if(y<>0) then for i:=1 to y do  qq[u[i]]:=0;
for i:=1 to st do
begin
us1[i]:=(2*e[i]/cd[i])*(-1.5*qq[d1[i]]-0.5*qq[d2[i]]+2*qq[d3[i]]);
us2[i]:=(2*e[i]/cd[i])*(0.5*qq[d1[i]]+1.5*qq[d2[i]]-2*qq[d2[i]]);
us3[i]:=(2*e[i]/cd[i])*(-0.5*qq[d1[i]]+0.5*qq[d2[i]]);
end;

(*Tnh fan luc*);
 rr:=sbt+1;
 for j:=1 to sbt do
 for i:=rr to tbt do     sr[i,j]:=s[i,j];
 for i:= rr to tbt do
 begin
   fl[i]:=0; for k:=1 to sbt do  fl[i]:= fl[i]+sr[i,k]*qq[k]-f[i];
 end;

(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln('gia tri ung suat');
for i:=1 to st do
begin
writeln(us1[i]);
writeln(us2[i]);
writeln(us3[i]);
end;
writeln('gia tri fan luc');
for i:=rr to tbt do
writeln(fl[i]);
readln;
end.
```

```
Program CTR4_Tinh_gian_phang;
 uses crt;
Type mt1=array[1..20,1..20] of real;  mt2=array[1..20] of real;
    mt3= array[1..20]of integer;
Var i,j, k,sn,st,sbt,tbt,ss,rr:integer; q,r:real;
 a,cd,b,c,d,f,qq,us,fl,l,m,dt,e,x1,x2,y1,y2:mt2;
 n1,n2,d1,d2,d3,d4:mt3;
 s,sr:mt1;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
  s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
       Begin
         if(a[s,s]<>0) then
         q:=a[s,i]/a[s,s];
         for j:=i to n do
          a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
  UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
  end;

   begin  clrscr;
   (*Nguoi lap trinh:Vo nhu Cau*);
   writeln('nhap tong so BTD');
   readln(tbt);
   writeln('nhap so thanh');
   readln(st);
   writeln ('nhap so BTD co chuyen vi');
   readln (sbt);
   writeln('nhap ngoai luc');
   for i :=1 to sbt do
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```
  readln(f[i]);
  writeln('nhap toa do x1'); for i:=1 to st do readln(x1[i]);
  writeln('nhap toa do x2'); for i:=1 to st do  readln(x2[i]);
  writeln('nhap toa do y1'); for i:=1 to st do readln(y1[i]);
  writeln('nhap toa do y2'); for i:=1 to st do  readln(y2[i]);
  writeln('nhap dien tich'); for i:=1 to st do readln(dt[i]);
  writeln('nhap modun dan hoi'); for i:=1 to st do readln(e[i]);
  writeln('nhap thu tu bac tu do d1'); for i:=1 to st do readln(d1[i]);
  writeln('nhap thu tu bac tu do d2');  for i:=1 to st do   readln(d2[i]);
  writeln('nhap thu tu bac tu do d3'); for i:=1 to st do   readln(d3[i]);
  writeln('nhap thu tu bac tu do d4');  for i:=1 to st do   readln(d4[i]);

  (* Ghep cac MTDC rieng vao MTDC tong the*);
  for i:=1 to st do
  begin
     cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(y2[i]-y1[i]));
     l[i]:=(x2[i]-x1[i])/cd[i];  m[i]:=(y2[i]-y1[i])/cd[i];
     b[i]:=sqr(l[i])*e[i]*dt[i]/cd[i]; c[i]:=l[i]*m[i]*e[i]*dt[i]/cd[i];
     d[i]:=sqr(m[i])*e[i]*dt[i]/cd[i];
  end;
  for i:=1 to st do
  begin
     s[d1[i],d1[i]]:=s[d1[i],d1[i]]+b[i];
     s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c[i];
     s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
     s[d1[i],d3[i]]:= s[d1[i],d3[i]]-b[i];
     s[d2[i],d3[i]]:= s[d2[i],d3[i]]-c[i];
     s[d3[i],d3[i]]:= s[d3[i],d3[i]]+b[i];
     s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c[i];
     s[d2[i],d4[i]]:=s[d2[i],d4[i]]-d[i];
     s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c[i];
     s[d4[i],d4[i]]:=s[d4[i],d4[i]]+d[i];
  end;
  for i:=1 to tbt do
  for j:= 1 to i-1 do      s[i,j]:=s[j,i];

(*Goi chuong trinh con de tinh chuyen vi*);
GHFT(s,f,qq,sbt);

(*Tinh fan luc*);
rr:=sbt+1;
for i:=rr to tbt do
for j:=1 to sbt do  fl[i]:=0;   fl[i]:= fl[i]+sr[i,j]*qq[j];
```

```
(*Tinh ung suat*);
for i:=1 to st do
us[i]:=(e[i]/cd[i])*(l[i]*(qq[d3[i]]-qq[d1[i]])+m[i]*(qq[d4[i]]-qq[d2[i]]));

(*Doc ket qua*);
 writeln ('gia tri chuyen vi la');
 for i:=1 to sbt do
 writeln(qq[i]);
 writeln ('gia tri ung suat la');
 for i:=1 to st do
 writeln(us[i]);
 writeln ('gia tri fan luc');
 for i:=rr to tbt do
 writeln(fl[i]);
 readln;
 end.
```

```
Program CTR5_Tinh_gian_khong_gian;
 uses crt;
type  mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
     mt3=array[1..20]of integer;
Var i,j, k,tbt,st,sbn,sbt,ss,rr:integer;
 x1,x2,y1,y2,z1,z2,md,a,b,c,d,x,y,f,qq,fl,us,l,m,n,cd,dt,e:mt2;
 d1,d2,d3,d4,d5,d6:mt3;
 s,sr:mt1;   q,r:real;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
       if(a[s,s]<>0) then
       q:=a[s,i]/a[s,s];
       for j:=i to n do
        a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
      End
 UNTIL(s= n -1);  if(a[n,n]<>0) then
 x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
    Begin
       r :=0;
       for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
       if(a[i,i]<>0) then
       x[i]:= (b[i]-r)/ a[i,i];
    End;
end;

begin  clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
 writeln('nhap tong so BTD ');
 readln(tbt);
 writeln('nhap so thanh');
 readln(st);
 writeln ('nhap so BTD co chuyen vi');
 readln (sbt);
 writeln('nhap ngoai luc');
 for i :=1 to sbt do
 readln(f[i]);
```

```
writeln('nhap x1'); for i:=1 to st do readln(x1[i]);
writeln('nhap x2'); for i:=1 to st do  readln(x2[i]);
writeln('nhap y1'); for i:=1 to st do  readln(y1[i]);
writeln('nhap y2'); for i:=1 to st do readln(y2[i]);
writeln('nhap z1'); for i:=1 to st do  readln(z1[i]);
writeln('nhap z2'); for i:=1 to st do readln(z2[i]);
writeln('nhap dien tich'); for i:=1 to st do readln(dt[i]);
writeln('nhap modun dan hoi'); for i:=1 to st do readln(e[i]);
writeln('nhap thu tu bac tu do');
writeln('nhap  d1[i]');  for i:=1 to st do readln(d1[i]);
writeln('nhap  d2[i]');  for i:=1 to st do readln(d2[i]);
writeln('nhap  d3[i]');  for i:=1 to st do readln(d3[i]);
writeln('nhap  d4[i]');  for i:=1 to st do readln(d4[i]);
writeln('nhap  d5[i]');  for i:=1 to st do readln(d5[i]);
writeln('nhap  d6[i]');  for i:=1 to st do readln(d6[i]);

(*Ghep cac ma tran do cung rieng vao MTDC tong the*);
 for i:=1 to st do
 begin
  cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(y2[i]-y1[i])+sqr(z2[i]-z1[i]));
  if(cd[i]<>0) then
  begin
  l[i]:=(x2[i]-x1[i])/cd[i]; m[i]:=(y2[i]-y1[i])/cd[i];
  n[i]:=(z2[i]-z1[i])/cd[i];
  a[i]:=sqr(l[i])*e[i]*dt[i]/cd[i];     b[i]:=l[i]*m[i]*e[i]*dt[i]/cd[i];
  c[i]:=l[i]*n[i]*e[i]*dt[i]/cd[i];     d[i]:=sqr(m[i])*e[i]*dt[i]/cd[i];
  x[i]:=m[i]*n[i]*e[i]*dt[i]/cd[i];     y[i]:=sqr(n[i])*e[i]*dt[i]/cd[i];
  end;
 end;
 for i:=1 to st do
 begin
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+a[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+b[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]+x[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+y[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]-a[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]-b[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+a[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]-b[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]-d[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]-x[i];
```

```
  s[d4[i],d5[i]]:=s[d4[i],d5[i]]+b[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+d[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]-c[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]-x[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]-y[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]+c[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+x[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+y[i];
 end;
 for i:=1 to tbt do
 for j:=1 to i-1 do        s[i,j]:=s[j,i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

 (*Tinh ung suat*);
 for i :=1 to st do
 us[i]:=(e[i]/cd[i])*(l[i]*(qq[d4[i]]-qq[d1[i]])+m[i]*(qq[d5[i]]-
 qq[d2[i]])+n[i]*(qq[d6[i]]-qq[d3[i]]));

(*Doc ket qua*)
writeln ('chuyen vi');
for i:=1 to sbt do
writeln (qq[i]);
writeln ('ung suat');
for i:=i to st do
writeln (us[i]);
readln;
end.
```

```
Program CTR6_Tinh_gian_phang_chiu_tac_dung_cua_nhiet_do;
 uses crt;
 Var i,j, k,st,sbt,tbt,ss,rr:integer;
 e,dt,cd,b,c,d,f,ft,fn,qq,fl,ff,us,l,m,eal:array[1..10] of real;
 d1,d2,d3,d4:array[1..10]of integer;
 s,sc,sr,ke:array[1..20,1..20] of real; q,r,hg,del:real;

 begin clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
 writeln('nhap tong so BTD');
 readln(tbt);
 writeln('nhap so thanh');
 readln(st);
 writeln ('nhap so BTD co chuyen vi');
 readln (sbt);
 writeln('nhap so thu tu bac tu do ');
 writeln('nhap d1'); for i:=1 to st do readln(d1[i]);
 writeln('nhap d2'); for i:=1 to st do  readln(d2[i]);
 writeln('nhap d3'); for i:=1 to st do  readln(d3[i]);
 writeln('nhap d4'); for i:=1 to st do  readln(d4[i]);
 writeln('nhap cosin dh l'); for i:=1 to st do  readln(l[i]);
 writeln('nhap cosin dh m'); for i:=1 to st do readln(m[i]);
 writeln('nhap chieu dai'); for i:=1 to st do readln(cd[i]);
 writeln('nhap mo dun dan hoi E'); for i:=1 to st do readln(e[i]);
 writeln('nhap dien tich tiet dien'); for i:=1 to st do readln(dt[i]);
 writeln('nhap he so gian no'); readln(hg);
 writeln('nhap so gia nhiet do');  readln(del);
 writeln('nhap cac thanh fan ngoai luc'); for i:=1 to sbt do readln(fn[i]);

 (*Tinh cac thanh fan tai trong tuong duong do nhiet do*);
 for i:= 1 to st do
 begin
 ff[i]:=-dt[i]*e[i]*hg*del;  ft[d1[i]]:=ft[d1[i]}+ff[i]*l[i];
 ft[d2[i]]:=ft[d2[i]]+ff[i]*m[i];   ft[d3[i]]:= ft[d3[i]]-ff[i]*l[i];
 ft[d4[i]]:=ft[d4[i]}-ff[i]*m[i];
 end;
 for i:=i to sbt do        f[i]:=ft[i]+fn[i];
 (*Ghep cac MTDC riengvao MTDC tong the *);
 for i:=1 to st do
   begin
 b[i]:=sqr(l[i])*e[i]*dt[i]/cd[i];    c[i]:=l[i]*m[i]*e[i]*dt[i]/cd[i];
 d[i]:=sqr(m[i])*e[i]*dt[i]/cd[i];
 end;
 for i:=1 to st do
```

```
 begin
 s[d1[i],d1[i]]:=s[d1[i],d1[i]]+b[i];
 s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c[i];
 s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
 s[d1[i],d3[i]]:= s[d1[i],d3[i]]-b[i];
 s[d2[i],d3[i]]:= s[d2[i],d3[i]]-c[i];
 s[d3[i],d3[i]]:= s[d3[i],d3[i]]+b[i];
 s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c[i];
 s[d2[i],d4[i]]:=s[d2[i],d4[i]]-d[i];
 s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c[i];
 s[d4[i],d4[i]]:=s[d4[i],d4[i]]+d[i];
 end;
 for i:=1 to tbt do
 for j:=1 to i-1 do        s[i,j]:=s[j,i];

 (*Chia khoi ma tran*);
 for i := 1 to sbt do
 for j:=1 to sbt do
  sc[i,j]:=s[i,j];
(*Giai he fuong trinh theo fuong fap Gauss*);
    ss:=0;
 REPEAT
    ss:=ss+1;
    for i:= ss+1 to sbt do
      Begin
       if(sc[ss,ss]<>0) then
       q:=sc[ss,i]/sc[ss,ss];
       for j:=i to sbt do
       sc[i,j]:= sc[i,j]-sc[ss,j]*q; f[i]:=f[i]-f[ss]*q;
      End
UNTIL(ss= sbt -1);
if(sc[sbt,sbt]<>0) then
qq[sbt]:=f[sbt]/sc[sbt,sbt];
 for i:= sbt -1  downto 1 do
   Begin
      r :=0;
      for j:= sbt  downto i+1 do r:=r+sc[i,j]*qq[j];

(*Tinh fan luc*);
rr:=sbt+1;
for j:=1 to sbt do
for i:=rr to tbt do     sr[i,j]:=s[i,j];
for i:= rr to tbt do
begin
```

```
 fl[i]:=0; for k:=1 to sbt do  fl[i]:= fl[i]+sr[i,k]*qq[k];
end;

(*Tinh ung suat*);
for i:=1 to st do
us[i]:=(e[i]/cd[i])*l[i]*(qq[d3[i]]-qq[d1[i]])
+m[i]*(qq[d4[i]]-qq[d2[i]])-e[i]*hg*del;

writeln ('gia tri chuyen vi la');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('gia tri ung suat');
for i:=1 to st do
writeln(us[i]);
writeln ('gia tri fan luc');
for i:=rr to tbt do
for j:=1 to sbt do
writeln(fl[i]);
readln;
end.
```

```
Program CTR7_Tinh_gian_phang_che_tao_khong_chinh_xac;
 uses crt;
 Type  mt1=array[1..20,1..20] of real;     mt2=array[1..10] of real;
Var i,j, k,sn,st,sbt,tbt,ss,rr,x:integer;
 e,cd,dt,b,c,d,f,ft,qq,fl,ff,us,l,m,det,t:mt2;
 g,d1,d2,d3,d4:array[1..10]of integer;
 s,sc,sr:mt1;   q,r,hg:real;
 Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
 var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
       Begin
         if(a[s,s]<>0) then
         q:=a[s,i]/a[s,s];
         for j:=i to n do
          a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
 UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
    Begin
       r :=0;
       for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
       if(a[i,i]<>0) then
       x[i]:= (b[i]-r)/ a[i,i];
    End;
end;
 begin  clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
 writeln('nhap tong so BTD');
 readln(tbt);
 writeln('nhap so thanh');
 readln(st);
 writeln ('nhap so BTD co chuyen vi');
 readln (sbt);
 writeln('nhap so thu tu bac tu do ');
 writeln('nhap d1'); for i:=1 to st do readln(d1[i]);
 writeln('nhap d2'); for i:=1 to st do   readln(d2[i]);
 writeln('nhap d3'); for i:=1 to st do   readln(d3[i]);
 writeln('nhap d4'); for i:=1 to st do   readln(d4[i]);
 writeln('nhap chieu dai'); for i:=1 to st do  readln(cd[i]);
```

```
writeln('nhap cosin dh l'); for i:=1 to st do  readln(l[i]);
writeln('nhap cosin dh m'); for i:=1 to st do readln(m[i]);
writeln('nhap mo dun dan hoi E'); for i:=1 to st do readln(e[i]);
writeln('nhap dien tich tiet dien'); for i:=1 to st do readln(dt[i]);
writeln('nhap he so gian no tuong duong'); readln(hg);
writeln('nhap so thanh che tao khong chinh xac'); readln(x);
writeln('nhap so thu tu thanh che tao khong chinh xac');
for i:=1 to x do readln(g[i]);
writeln('nhap do dai doi ra hoac do ngan hut');
for i:=1 to x do readln(det[i]);

(*Tinh cac thanh fan tai trong do che tao khong chinh xac*);
for i:= 1 to x do
begin
t[i]:=det[i]/(hg*cd[g[i]]);  ff[i]:=-e[g[i]]*dt[g[i]]*hg*t[i];
ft[d1[g[i]]]:=ft[d1[g[i]]]+ff[i]*l[g[i]];
ft[d2[g[i]]]:=ft[d2[g[i]]]+ff[i]*m[g[i]];
ft[d3[g[i]]]:=ft[d3[g[i]]]-ff[i]*l[g[i]];
ft[d4[g[i]]]:=ft[d4[g[i]]]-ff[i]*m[g[i]];
end;
for i:=1 to sbt do      f[i]:=ft[i];

(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to st do
begin
b[i]:=sqr(l[i])*e[i]*dt[i]/cd[i];   c[i]:=l[i]*m[i]*e[i]*dt[i]/cd[i];
d[i]:=sqr(m[i])*e[i]*dt[i]/cd[i];
end;
for i:=1 to st do
begin
s[d1[i],d1[i]]:=s[d1[i],d1[i]]+b[i];
s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c[i];
s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
s[d1[i],d3[i]]:= s[d1[i],d3[i]]-b[i];
s[d2[i],d3[i]]:= s[d2[i],d3[i]]-c[i];
s[d3[i],d3[i]]:= s[d3[i],d3[i]]+b[i];
s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c[i];
s[d2[i],d4[i]]:=s[d2[i],d4[i]]-d[i];
s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c[i];
s[d4[i],d4[i]]:=s[d4[i],d4[i]]+d[i];
end;
for i:=1 to tbt do
for j:=1 to i-1 do      s[i,j]:=s[j,i];
```

```
 (*Chia khoi ma tran*);
 for i := 1 to sbt do
 for j:=1 to sbt do
   sc[i,j]:=s[i,j];

(*Goi chuong trinh con de giai he fuong trinh*);
GHFT(s,f,qq,sbt);

(*Tinh fan luc*);
rr:=sbt+1;
 for j:=1 to sbt do
 for i:=rr to tbt do     sr[i,j]:=s[i,j];
 for i:= rr to tbt do
 begin
 fl[i]:=0; for k:=1 to sbt do  fl[i]:= fl[i]+sr[i,k]*qq[k];
 end;

(*Tinh ung suat*);
for i:=1 to st do
us[i]:=(e[i]/cd[i])*l[i]*(qq[d3[i]]-qq[d1[i]])
+m[i]*(qq[d4[i]]-qq[d2[i]]);

writeln ('gia tri chuyen vi la');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('gia tri ung suat');
for i:=1 to st do
writeln(us[i]);
writeln ('gia tri fan luc');
for i:=rr to tbt do
for j:=1 to sbt do
writeln(fl[i]);
readln;
end.
```

```
Program TR8_Bai_toan_hai_chieu_kieu_FTHH_tam_giac_bien_dang_khong_doi;
Uses crt;
type mt1=array[1..10,1..20] of real; mt2=array[1..20] of real;
     mt3= array[1..20] of integer;
Var    d1,d2,d3,d4,d5,d6,u: mt3;
       f,fl,fb,ft,fn,e,x1,x2,x3,y1,y2,y3,qq,px,py,dt,det,c1,c2,c3,c4,
       c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15,c16,c17,c18,c19,c20,c21,e1,e2,
       e3,e4,e5,e6,e7,e8,e9,e10,e11,e12,e13,e14,e15,e16,e17,e18,y23,y31,y12,
       y13,x32,x13,x21,x23,h1,h2,us1,us2,us3:mt2;
       i,j,k,ss,sn,sf,sbt,tbt,rr,x:integer;  q,r,hp,h,tx,ty:real;
       s:mt1;
Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
        if(a[s,s]<>0) then
        q:=a[s,i]/a[s,s];
        for j:=i to n do
         a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
  UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
  end;

  begin clrscr;
  (*Nguoi lap trinh:Vo nhu Cau*);
   writeln('nhap so nut');
   readln(sn);
   writeln('so fan tu');
   readln(sf);
   writeln('nhap so BTD co chuyen vi');
   readln(sbt);
   writeln('nhap tong so so BTD ');
```

```
readln(tbt);
writeln('nhap so BTD co chuyen vi triet tieu ');
readln(x);
writeln('nhap so thu tu BTD co chuyen vi triet tieu ');
if(x<>0) then for i:=1 to x do
readln(u[i]);
writeln('btd d1'); for i :=1 to sf do  readln(d1[i]);
writeln('btd d2'); for i :=1 to sf do  readln(d2[i]);
writeln('btd d3'); for i :=1 to sf do  readln(d3[i]);
writeln('btd d4'); for i :=1 to sf do  readln(d4[i]);
writeln('btd d5'); for i :=1 to sf do  readln(d5[i]);
writeln('btd d6'); for i :=1 to sf do  readln(d6[i]);
writeln('toa do x1'); for i :=1 to sf do  readln(x1[i]);
writeln('toa do x2'); for i :=1 to sf do  readln(x2[i]);
writeln('toa do x3'); for i :=1 to sf do  readln(x3[i]);
writeln('toa do y1'); for i :=1 to sf do  readln(y1[i]);
writeln('toa do y2'); for i :=1 to sf do  readln(y2[i]);
writeln('toa do y3'); for i :=1 to sf do  readln(y3[i]);
writeln('nhap modun dan hoi');
for i:=1 to sf do  readln(e[i]);
writeln('nhap be day tam');
readln(h);
writeln('nhap he so Poatxong');
readln(hp);
writeln('nhap ti trong tren fuong x');
readln(tx);
writeln('nhap ti trong tren fuong y');
readln(ty);
writeln('nhap luc bien');
for i:=1 to sbt do  readln(fb[i]);
writeln('nhap thanh fan ngoai luc');
for i:=1 to sbt do  readln(fn[i]);
(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to sf do
begin
y23[i]:=y2[i]-y3[i];   y31[i]:=y3[i]-y1[i];  y12[i]:=y1[i]-y2[i];
y13[i]:=-y31[i];       x32[i]:=x3[i]-x2[i];  x13[i]:=x1[i]-x3[i];
x21[i]:=x2[i]-x1[i];   x23[i]:=-x32[i];
det[i]:=x13[i]*y23[i]-x23[i]*y13[i];   dt[i]:=det[i]/2;
h1[i]:=dt[i]*h*e[i]/((1-sqr(hp))*sqr(det[i]));
c1[i]:=h1[i]*(sqr(y23[i])+sqr(x32[i])*(1-hp)/2);
c2[i]:=h1[i]*(y23[i]*x32[i]*hp+x32[i]*y23[i]*(1-hp)/2);
c3[i]:=h1[i]*(y23[i]*y31[i]+x32[i]*x13[i]*(1-hp)/2);
c4[i]:=h1[i]*(y23[i]*x13[i]*hp+x32[i]*y31[i]*(1-hp)/2);
```

```
c5[i]:=h1[i]*(y23[i]*y12[i]+x32[i]*x21[i]*(1-hp)/2);
c6[i]:=h1[i]*(y23[i]*x21[i]*hp+x32[i]*y12[i]*(1-hp)/2);
c7[i]:=h1[i]*(sqr(x32[i])+sqr(y23[i]))*(1-hp)/2);
c8[i]:=h1[i]*(x32[i]*y31[i]*hp+y23[i]*x13[i]*(1-hp)/2);
c9[i]:=h1[i]*(x32[i]*x13[i]+y23[i]*y31[i]*(1-hp)/2);
c10[i]:=h1[i]*(x32[i]*y12[i]*hp+y23[i]*x21[i]*(1-hp)/2);
c11[i]:=h1[i]*(x32[i]*x21[i]+y23[i]*y12[i]*(1-hp)/2);
c12[i]:=h1[i]*(sqr(y31[i])+sqr(x13[i])*(1-hp)/2);
c13[i]:=h1[i]*(y31[i]*x13[i]*(1+hp)/2);
c14[i]:=h1[i]*(y31[i]*y12[i]+x13[i]*x21[i]*(1-hp)/2);
c15[i]:=h1[i]*(y31[i]*x21[i]+x13[i]*y12[i]*(1-hp)/2);
c16[i]:=h1[i]*(sqr(x13[i])+sqr(y31[i])*(1-hp)/2);
c17[i]:=h1[i]*(x13[i]*y12[i]*hp+y31[i]*x21[i]*(1-hp)/2);
c18[i]:=h1[i]*(x13[i]*x21[i]+y31[i]*y12[i]*(1-hp)/2);
c19[i]:=h1[i]*(sqr(y12[i])+sqr(x21[i])*(1-hp)/2);
c20[i]:=h1[i]*(y12[i]*x21[i]*(1+hp)/2);
c21[i]:=h1[i]*(sqr(x21[i])+sqr(y12[i])*(1-hp)/2);
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c7[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c3[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]+c8[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c12[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]+c4[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]+c9[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c13[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c16[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]+c5[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]+c10[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c14[i];
  s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c17[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c19[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c6[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]+c11[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c15[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]+c18[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c20[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c21[i];
 end;
 for i:=1 to tbt do
 for j:=1 to i-1 do    s[i,j]:=s[j,i];

(*Ghep cac vecto tai trong*);
for i:=1 to sf do
```

```
begin
px[i]:=tx*h*dt[i];  py[i]:=ty*h*dt[i]; ft[d1[i]]:=px[i]; ft[d2[i]]:=py[i];
ft[d3[i]]:=px[i];   ft[d4[i]]:=py[i];  ft[d5[i]]:=px[i]; ft[d6[i]]:=py[i];
end;
for i:=1 to sbt do   f[i]:=ft[i]+fb[i]+fn[i];
(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Tinh ung suat*);
if(x<>0) then for i:=1 to x do qq[u[i]]:=0;
for i:=1 to sf do
begin
h2[i]:=e[i]/((1-sqr(hp))*det[i]);
e1[i]:=h2[i]*y23[i];   e2[i]:=h2[i]*hp*x32[i];   e3[i]:=h2[i]*y31[i];
e4[i]:=h2[i]*hp*x13[i]; e5[i]:=h2[i]*y12[i];     e6[i]:=h2[i]*hp*x21[i];
e7[i]:=h2[i]*hp*y23[i]; e8[i]:=h2[i]*x32[i];     e9[i]:=h2[i]*hp*y31[i];
e10[i]:=h2[i]*x13[i];   e11[i]:=h2[i]*hp*y12[i]; e12[i]:=h2[i]*x21[i];
e13[i]:=h2[i]*x32[i]*(1-hp)/2;  e14[i]:=h2[i]*y23[i]*(1-hp)/2;
e15[i]:=h2[i]*x13[i]*(1-hp)/2;  e16[i]:=h2[i]*y31[i]*(1-hp)/2;
e17[i]:=h2[i]*x21[i]*(1-hp)/2;  e18[i]:=h2[i]*y12[i]*(1-hp)/2;
us1[i]:=e1[i]*qq[d1[i]]+e2[i]*qq[d2[i]]+e3[i]*qq[d3[i]]+e4[i]*qq[d4[i]]+
e5[i]*qq[d5[i]]+e6[i]*qq[d6[i]];
us2[i]:=e7[i]*qq[d1[i]]+e8[i]*qq[d2[i]]+e9[i]*qq[d3[i]]+e10[i]*qq[d4[i]]+
e11[i]*qq[d5[i]]+e12[i]*qq[d6[i]];
us3[i]:=e13[i]*qq[d1[i]]+e14[i]*qq[d2[i]]+e15[i]*qq[d3[i]]+e16[i]*qq[d4[i]]+
e17[i]*qq[d5[i]]+e18[i]*qq[d6[i]];
end;

(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do writeln (qq[i]);
writeln('gia tri ung suat');
for i:=1 to sf do writeln (us1[i]);
for i:=1 to sf do writeln (us2[i]);
for i:=1 to sf do writeln (us3[i]);
readln;
end.
```

```
Program CTR9_Tinh_gan_dung_vat_ran_tron_xoay_chiu_tai_trong_doi_xung;
Uses crt;
type   mt1=array[1..20,1..20] of real;mt2= array[1..20] of real;
     mt3= array[1..20] of integer;
Var    d1,d2,d3,d4,d5,d6,u:mt3;
     f,fl,fb,ft,fn,r1,r2,r3,z1,z2,z3,rt,qq,pr,pz,dt,det,c1,c2,c3,c4,
     c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15,c16,c17,c18,c19,c20,c21,
     z23,z31,z12,z13,r32,r13,r21,r23,h,us1,us2,us3,us4,b1,b2,b3,b4,b5,b6,
     b7:mt2;
     i,j,k,ss,sn,sf,sbt,tbt,rr,x:integer;  q,r,hp,tr,tz,e,e1,e2,e3:real;
     s:mt1;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var    i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
    s:=s+1;
    for i:= s+1 to n do
     Begin
      if(a[s,s]<>0) then
      q:=a[s,i]/a[s,s];
      for j:=i to n do
       a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
     End
 UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
    Begin
      r :=0;
      for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
      if(a[i,i]<>0) then
      x[i]:= (b[i]-r)/ a[i,i];
    End;
 end;
 begin clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
  writeln('nhap tong so BTD');
  readln(tbt);
  writeln('so fan tu');
  readln(sf);
  writeln('nhap so BTD co chuyen vi');
  readln(sbt);
  writeln('nhap tong so so BTD ');
  readln(tbt);
```

```
writeln('nhap so BTD co chuyen vi triet tieu ');
readln(x);
writeln('nhap so thu tu BTD co chuyen vi triet tieu ');
if(x<>0) then for i:=1 to x do
readln(u[i]);
writeln('btd d1'); for i :=1 to sf do  readln(d1[i]);
writeln('btd d2'); for i :=1 to sf do  readln(d2[i]);
writeln('btd d3'); for i :=1 to sf do  readln(d3[i]);
writeln('btd d4'); for i :=1 to sf do  readln(d4[i]);
writeln('btd d5'); for i :=1 to sf do  readln(d5[i]);
writeln('btd d6'); for i :=1 to sf do  readln(d6[i]);
writeln('toa do r1'); for i :=1 to sf do  readln(r1[i]);
writeln('toa do r2'); for i :=1 to sf do  readln(r2[i]);
writeln('toa do r3'); for i :=1 to sf do  readln(r3[i]);
writeln('toa do z1'); for i :=1 to sf do  readln(z1[i]);
writeln('toa do z2'); for i :=1 to sf do  readln(z2[i]);
writeln('toa do z3'); for i :=1 to sf do  readln(z3[i]);
writeln('nhap modun dan hoi');
readln(e);
writeln('nhap he so Poatxong');
readln(hp);
writeln('nhap ti trong tren fuong r');
readln(tr);
writeln('nhap ti trong tren fuong z');
readln(tz);
writeln('nhap luc bien');
for i:=1 to sbt do  readln(fb[i]);
writeln('nhap thanh fan ngoai luc');
for i:=1 to sbt do  readln(fn[i]);

(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to sf do
begin
z23[i]:=z2[i]-z3[i];   z31[i]:=z3[i]-z1[i];  z12[i]:=z1[i]-z2[i];
z13[i]:=-z31[i];       r32[i]:=r3[i]-r2[i];  r13[i]:=r1[i]-r3[i];
r21[i]:=r2[i]-r1[i];   r23[i]:=-r32[i];
det[i]:=r13[i]*z23[i]-r23[i]*z13[i];   dt[i]:=det[i]/2;
rt[i]:=(r1[i]+r2[i]+r3[i])/3;  h[i]:=2*3.1416*rt[i]*dt[i];
b1[i]:=z23[i]/det[i];  b2[i]:=z31[i]/det[i];  b3[i]:=z12[i]/det[i];
b4[i]:=r32[i]/det[i];  b5[i]:=r13[i]/det[i];  b6[i]:=r21[i]/det[i];
b7[i]:=1/(3*rt[i]); e1:=(e*(1-hp))/((1+hp)*(1-2*hp)); e2:=e1*hp/(1-hp);
e3:=e1*(1-2*hp)/(2*(1-hp));
c1[i]:=((b1[i]*e1+b7[i]*e2)*b1[i]+(b4[i]*e3)*b4[i]+
(b1[i]*e2+b7[i]*e1)*b7[i])*h[i];
c2[i]:=((b1[i]*e2+b7[i]*e2)*b4[i]+(b4[i]*e3)*b1[i])*h[i];
```

```
c3[i]:=((b1[i]*e1+b7[i]*e2)*b2[i]+(b4[i]*e3)*b5[i]+
(b1[i]*e2+b7[i]*e1)*b7[i])*h[i];
c4[i]:=((b1[i]*e2+b7[i]*e2)*b5[i]+(b4[i]*e3)*b2[i])*h[i];
c5[i]:=((b1[i]*e1+b7[i]*e2)*b3[i]+(b4[i]*e3)*b6[i]+
(b1[i]*e2+b7[i]*e1)*b7[i])*h[i];
c6[i]:=((b1[i]*e2+b7[i]*e2)*b6[i]+(b4[i]*e3)*b3[i])*h[i];
c7[i]:=((b4[i]*e1)*b4[i]+(b1[i]*e3)*b1[i])*h[i];
c8[i]:=((b4[i]*e2)*b2[i]+(b1[i]*e3)*b5[i]+(b4[i]*e2)*b7[i])*h[i];
c9[i]:=((b4[i]*e1)*b5[i]+(b1[i]*e3)*b2[i])*h[i];
c10[i]:=((b4[i]*e2)*b3[i]+(b1[i]*e3)*b6[i]+(b4[i]*e2)*b7[i])*h[i];
c11[i]:=((b4[i]*e1)*b6[i]+(b1[i]*e3)*b3[i])*h[i];
c12[i]:=((b2[i]*e1+b7[i]*e2)*b2[i]+(b5[i]*e3)*b5[i]+
(b2[i]*e2+b7[i]*e1)*b7[i])*h[i];
c13[i]:=((b2[i]*e2+b7[i]*e2)*b5[i]+(b5[i]*e3)*b2[i])*h[i];
c14[i]:=((b2[i]*e1+b7[i]*e2)*b3[i]+(b5[i]*e3)*b6[i]+
(b2[i]*e2+b7[i]*e1)*b7[i])*h[i];
c15[i]:=((b2[i]*e2+b7[i]*e2)*b6[i]+(b5[i]*e3)*b3[i])*h[i];
c16[i]:=((b5[i]*e1)*b5[i]+(b2[i]*e3)*b2[i])*h[i];
c17[i]:=((b5[i]*e2)*b3[i]+(b2[i]*e3)*b6[i]+(b5[i]*e2)*b7[i])*h[i];
c18[i]:=((b5[i]*e1)*b6[i]+(b2[i]*e3)*b3[i])*h[i];
c19[i]:=((b3[i]*e1+b7[i]*e2)*b3[i]+(b6[i]*e3)*b6[i]+
(b3[i]*e2+b7[i]*e1)*b7[i])*h[i];
c20[i]:=((b3[i]*e2+b7[i]*e2)*b6[i]+(b6[i]*e3)*b3[i])*h[i];
c21[i]:=((sqr(b6[i]))*e1+(sqr(b3[i]))*e3)*h[i];
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c3[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]+c4[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]+c5[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c7[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]+c8[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c12[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]+c9[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c13[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c16[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]+c10[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c14[i];
  s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c17[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c19[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c6[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]+c11[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c15[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]+c18[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c20[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c21[i];
 end;
```

```
 for i:=1 to tbt do
 for j:=1 to i-1 do    s[i,j]:=s[j,i];

(*Ghep cac vecto tai trong*);
for i:=1 to sf do
begin
pr[i]:=tr*2*3.1416*rt[i]*dt[i];  pz[i]:=tz*2*3.1416*rt[i]*dt[i];
 ft[d1[i]]:=pr[i]; ft[d2[i]]:=pz[i];
ft[d3[i]]:=pr[i];   ft[d4[i]]:=pz[i];  ft[d5[i]]:=pr[i]; ft[d6[i]]:=pz[i];
end;
for i:=1 to sbt do   f[i]:=ft[i]+fb[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Tinh ung suat*);
if (x<>0) then for i:=1 to x do  qq[u[i]]:=0;
for i:=1 to sf do
begin
us1[i]:=(e1*b1[i]+e2*b7[i])*qq[d1[i]]+(e2*b4[i])*qq[d2[i]]+
(e1*b2[i]+e2*b7[i])*qq[d3[i]]+(e2*b5[i])*qq[d4[i]]+(e1*b3[i]+
e2*b7[i])*qq[d5[i]]+(e2*b6[i])*qq[d6[i]];
us2[i]:=+(e2*b1[i]+e2*b7[i])*qq[d1[i]]+(e1*b4[i])*qq[d2[i]}+
(e2*b2[i]+e2*b7[i])*qq[d3[i]]+(e1*b5[i])*qq[d4[i]]+
(e2*b3[i]+e2*b7[i])*qq[d5[i]]+(e1*b6[i])*qq[d6[i]];
us3[i]:=e3*b4[i]*qq[d1[i]]+e3*b1[i]*qq[d2[i]]+e3*b5[i]*qq[d3[i]]+
e3*b2[i]*qq[d4[i]]+e3*b6[i]*qq[d5[i]]+e3*b3[i]*qq[d6[i]];
us4[i]:=(e2*b1[i]+e1*b7[i])*qq[d1[i]]+(e2*b4[i])*qq[d2[i]]+
(e2*b2[i]+e1*b7[i])*qq[d3[i]]+(e2*b5[i])*qq[d4[i]]+(e2*b3[i]+
e1*b7[i])*qq[d5[i]]+(e2*b6[i])*qq[d6[i]];
end;

(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do writeln (qq[i]);
writeln('gia tri us1 ');
for i:=1 to sf do writeln (us1[i]);
writeln('gia tri us2 ');
for i:=1 to sf do writeln (us2[i]);
writeln('gia tri us3 ');
for i:=1 to sf do writeln (us3[i]);
writeln('gia tri us4 ');
for i:=1 to sf do writeln (us4[i]);
readln;
end.
```

```
Program CTR10_Tinh_dam_lien_tuc_goi_tua_thong_thuong;
 uses crt;
 type mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
 mt3=array[1..20]of integer;
Var i,j, k,st,sbt,tbt,ss,rr,x,y,z,w:integer;
 a1,b1,p,q1,e,f,fc,mq,qq,fl,l,m,m1,m2,cd,cd3,dt,c1,c2,c3,lc1,lc2,m1x,m2x,
 m1y,m2y,m1z,m2z,l1x,l2x,l1y,l2y,l1z,l2z,el,el1,el2,el3,mb1,mb2,ma,la,lb1,
 lb2,z1,z2,z3:mt2;
 n1,n2,a,b,c,d,d1,d2,k1,k2,k3,k4:mt3;
 s:mt1; q,r:real;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
       if(a[s,s]<>0) then
       q:=a[s,i]/a[s,s];
       for j:=i to n do
        a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
      End
  UNTIL(s= n -1);
   x[n]:=b[n]/a[n,n];
   for i:= n -1  downto 1 do
      Begin
         r :=0;
         for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
         if(a[i,i]<>0) then
         x[i]:= (b[i]-r)/ a[i,i];
      End;
  end;

   begin   clrscr;
   (*Nguoi lap trinh:Vo nhu Cau*);
   writeln('tong so BTD');
   readln(tbt);
   writeln('nhap so thanh');
   readln(st);
   writeln('nhap so bac tu do co chuyen vi');
   readln(sbt);
   writeln('nhap so bac tu do co chuyen vi triet tieu ');
```

```
 readln(w);
 writeln('nhap so  thu tu bac tu do co chuyen vi triet tieu ');
 if(w<>0) then for i:=1 to w do   readln(d[i]);
 writeln('nhap chieu dai thanh');
 for i :=1 to st do   readln(cd[i]);
 writeln ('nhap so thanh chiu tai trong fan bo deu');
 readln (x);
 writeln ('nhap so thanh chiu tai trong tap trung');
 readln(y);
 writeln ('nhap so thanh khong chiu tai trong ');
 readln(z);
 if(x<>0) then
 begin
 writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
 for i:=1 to x do
 readln (a[i]);
 writeln('nhap cuong do tai trong fan bo deu');
 for i:=1 to x do
 readln (q1[i]);
 end;
 if (y<>0)then
 begin
  writeln('nhap so thu tu thanh chiu tai trong tap trung');
  for i:=1 to y do      readln (b[i]);
  writeln('nhap tai trong tap trung');
  for i:= 1 to y do  readln (p[i]);
  writeln('nhap a1');
  for i:= 1 to y do  readln (a1[i]);
  writeln('nhap b1');
  for i:= 1 to y do readln (b1[i]);
 end;
  writeln('nhap so thu tu thanh khong chiu tai trong ');
  if (z<>0)then for i:=1 to z do readln(c[i]);
  writeln('nhap mo dun dan hoi');  for i:=1 to st do readln(e[i]);
 writeln('nhap mo men quan tinh');  for i:=1 to st do readln(mq[i]);
 writeln('nhap BTD d1');  for i:=1 to st do readln(d1[i]);
 writeln('nhap BTD d2 ');  for i:=1 to st do readln(d2[i]);
 (*Ghep cac MTDC rieng vao MTDC tong the*);
  if(cd[i]<>0) then
  begin
  for i:=1 to st do
  begin
    c1[i]:=4*e[i]*mq[i]/cd[i];
    c2[i]:=2*e[i]*mq[i]/cd[i];
```

```
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c1[i];
end;
end;
for i:=1 to sbt do
for j:=1 to i-1 do    s[i,j]:=s[j,i];

(*Ghep cac vec to tai trong*);
if (x<>0)then
begin
 for i:=1 to x do
 begin
 el[i]:=cd[a[i]]; k1[i]:=d1[a[i]]; k2[i]:=d2[a[i]];
 ma[i]:=(q1[i]*sqr(el[i])/12);
 end;
 for i:=1 to x do
 begin
 f[k1[i]]:=f[k1[i]]-ma[i];
 f[k2[i]]:=f[k2[i]]+ma[i];
 end;
end;
if (y<>0) then
begin
  for i:=1 to y do
  begin
  k3[i]:=d1[b[i]]; k4[i]:=d2[b[i]];   el1[i]:=cd[b[i]];
  mb1[i]:=(p[i]*a1[i]*sqr(b1[i])/sqr(el1[i]));
  mb2[i]:= (p[i]*b1[i]*sqr(a1[i])/sqr(el1[i]));
  end;
  for i:=1 to y do
  begin
  f[k3[i]]:=f[k3[i]]-mb1[i];
  f[k4[i]]:=f[k4[i]]+mb2[i]
  end;
end;

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

 (*Tinh mo men*);
 for i:=1 to w do      qq[d[i]]:=0;
 if(cd[i]<>0) then
 begin
```

```
 for i:=1 to st do
 begin
 z1[i]:=(e[i]*mq[i]/cd[i])*(4*qq[d1[i]]+2*qq[d2[i]]);
 z2[i]:=(e[i]*mq[i]/cd[i])*(2*qq[d1[i]]+4*qq[d2[i]]);
 m1[i]:=z1[i];
 m2[i]:=z2[i];
 end;
 end;
(*tinh tong mo men*);
 if (x<>0) then
 begin
 for i:=1 to x do
 begin
  m1x[i]:=m1[a[i]]+ma[i];
  m2x[i]:=m2[a[i]]-ma[i];
 end;
 end;
 if (y<>0) then
 begin
 for i:=1 to y do
 begin   if(sqr(el1[i])<>0) then
  m1y[i]:=m1[b[i]]+mb1[i];
  m2y[i]:=m2[b[i]]-mb2[i];
end;
end;
if(z<>0) then
begin
for i:=1 to z do
begin
m1z[i]:=m1[c[i]];     m2z[i]:=m2[c[i]];
end;
end;

(*Tinh luc cat*);
if (x<>0) then
begin
for i :=1 to x do
begin
 la[i]:=q1[i]*cd[a[i]]/2;
 l1x[i]:=-(m1x[i]+m2x[i])/cd[a[i]]-la[i];
 l2x[i]:=(m1x[i]+m2x[i])/cd[a[i]]-la[i];
end;
end;
if (y<>0) then
```

```
begin
for i :=1 to y do
 begin
 cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; if(cd3[i]<>0) then
 lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i]; lb2[i]:=p[i]-lb1[i];
 l1y[i]:=-(m1y[i]+m2y[i])/cd[b[i]]-lb1[i];
 l2y[i]:= (m1y[i]+m2y[i])/cd[b[i]]-lb2[i];
 end;
end;
if(z<>0) then
begin
for i:=1 to z do
begin
l1z[i]:=-(m1z[i]+m2z[i])/cd[c[i]]; l2z[i]:=(m1z[i]+m2z[i])/cd[c[i]];
end;
end;
(*Doc ket qua*);
writeln('gia tri chuyen vi la');
for i:=1 to sbt do
writeln(qq[i]);
writeln('gia tri mo men x');
if(x<>0) then
begin
for i:=1 to x do
writeln (m1x[i],m2x[i]);
end;
writeln('gia tri mo men y');
if(y<>0) then
begin
for i:=1 to y do
writeln (m1y[i],m2y[i]);
end;
writeln('gia tri mo men z');
if(z<>0) then
begin
for i:=1 to z do
writeln (m1z[i],m2z[i]);
end;
writeln('gia tri luc cat x');
if(x<>0) then
begin
for i:=1 to x do
writeln (l1x[i],l2x[i]);
end;
```

```
writeln('gia tri luc cat y');
if(y<>0) then
begin
for i:=1 to y do
writeln (l1y[i],l2y[i]);
end;
writeln('gia tri luc cat z');
if(z<>0) then
begin
for i:=1 to z do
writeln (l1z[i],l2z[i]);
end;
readln;
end.
```

```
Program CTR11_Tinh_dam_lien_tuc_tren_goi_tua_dan_hoi;
 uses crt;
type mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
    mt3=array[1..20]of integer;
Var i,j, k,sn,st,sbt,tbt,ss,rr,x,y,z,w,v:integer;
 a1,b1,p,q1,e,f,fc,mq,qq,l,m,m1,m2,cd,cd3,dt,c1,c2,c3,c4,lc1,lc2,m1x,m2x,
 m1y,m2y,m1z,m2z,l1x,l2x,l1y,l2y,l1z,l2z,mb1,mb2,ma,la,lb1,lb2,z1,hc:mt2;
 n1,n2,a,b,c,d,dd,e1,d1,d2,d3,d4,x1,x2,x3,x4,y1,y2,y3,y4:mt3;
 s:mt1;  q,r:real;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
        if(a[s,s]<>0) then
        q:=a[s,i]/a[s,s];
        for j:=i to n do
         a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
      End
 UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
 end;

  begin   clrscr;
  (*Nguoi lap trinh:Vo nhu Cau*);
  writeln('nhap tong so BTD');
  readln(tbt);
  writeln('nhap so thanh');
  readln(st);
  writeln('nhap so bac tu do co chuyen vi');
  readln(sbt);
  writeln('nhap so bac tu do co chuyen vi triet tieu ');
  readln(w);
```

```
writeln('nhap so thu tu bac tu do co chuyen vi triet tieu ');
if(w<>0) then for i:=1 to w do  readln(d[i]);
writeln('nhap so goi tua dan hoi');
readln(v);
writeln('nhap so thu tu bac tu do co goi tua dan hoi');
if(v<>0) then for i:=1 to v do readln(e1[i]);
writeln('nhap he so do cung');
if(v<>0) then for i:=1 to v do readln(hc[i]);
writeln('nhap chieu dai thanh');
for i :=1 to st do   readln(cd[i]);
writeln ('nhap so thanh chiu tai trong fan bo deu');
readln (x);
writeln ('nhap so thanh chiu tai trong tap trung');
readln(y);
writeln ('nhap so thanh khong chiu tai trong ');
readln(z);
if(x<>0) then
begin
writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
for i:=1 to x do
readln (a[i]);
writeln('nhap cuong do tai trong fan bo deu');
for i:=1 to x do
readln (q1[i]);
end;
if (y<>0)then
begin
 writeln('nhap so thu tu thanh chiu tai trong tap trung');
 for i:=1 to y do      readln (b[i]);
 writeln('nhap tai trong tap trung');
 for i:= 1 to y do  readln (p[i]);
 writeln('nhap a1');
 for i:= 1 to y do  readln (a1[i]);
 writeln('nhap b1');
 for i:= 1 to y do readln (b1[i]);
end;
 writeln('nhap so thu tu thanh khong chiu tai trong ');
 if (z<>0) then   for i:=1 to z do readln(c[i]);
 writeln('nhap mo dun dan hoi');  for i:=1 to st do readln(e[i]);
writeln('nhap mo men quan tinh');  for i:=1 to st do readln(mq[i]);
writeln('nhap BTD d1');  for i:=1 to st do readln(d1[i]);
writeln('nhap BTD d2 ');  for i:=1 to st do readln(d2[i]);
writeln('nhap BTD d3');  for i:=1 to st do readln(d3[i]);
writeln('nhap BTD d4');  for i:=1 to st do readln(d4[i]);
```

```
(*Ghep cac MTDC rieng vao MTDC tong the*);
 for i:=1 to st do
begin
    cd3[i]:=sqr(cd[i])*cd[i];
    if(((cd3[i]<>0)and(sqr(cd[i])<>0))and(cd[i]<>0)) then
    begin
    c1[i]:=12*e[i]*mq[i]/cd3[i];  c2[i]:=-6*e[i]*mq[i]/sqr(cd[i]);
    c3[i]:=4*e[i]*mq[i]/cd[i];    c4[i]:=2*e[i]*mq[i]/cd[i];
    end;
end;
for i:=1 to st do
begin
 s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
 s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
 s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
 s[d1[i],d3[i]]:=s[d1[i],d3[i]]-c1[i];
 s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c2[i];
 s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c1[i];
 s[d1[i],d4[i]]:=s[d1[i],d4[i]]+c2[i];
 s[d2[i],d4[i]]:=s[d2[i],d4[i]]+c4[i];
 s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c2[i];
 s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c3[i];
end;
for i:=1 to sbt do
for j:=1 to i-1 do  s[i,j]:=s[j,i];
for i:=1 to v do  s[e1[i],e1[i]]:=s[e1[i],e1[i]]+hc[i];
  (*Ghep cac vecto tai trong*);
  if (x<>0)then
  begin
     for i:=1 to x do
     begin
     la[i]:= q1[i]*cd[a[i]]/2;   ma[i]:=(q1[i]*sqr(cd[a[i]])/12);
     x1[i]:=d1[a[i]];          x2[i]:=d2[a[i]];        x3[i]:=d3[a[i]];
     x4[i]:=d4[a[i]];
     f[x1[i]]:=f[x1[i]]+la[i];
     f[x2[i]]:=f[x2[i]]-ma[i];
     f[x3[i]]:=f[x3[i]]+la[i];
      f[x4[i]]:=f[x4[i]]+ma[i];
     end;
   end;
    if (y<>0) then
   begin
   for i:=1 to y do
```

```
  begin
      cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; if(cd3[i]<>0) then
      lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i]; lb2[i]:=p[i]-lb1[i];
       mb1[i]:=(p[i]*a1[i]*sqr(b1[i])/sqr(cd[b[i]]));
      mb2[i]:=(p[i]*b1[i]*sqr(a1[i])/sqr(cd[b[i]]));
      y1[i]:=d1[b[i]];        y2[i]:=d2[b[i]];        y3[i]:=d3[b[i]];
      y4[i]:=d4[b[i]];
      if (cd3[i]<>0) then
      f[y1[i]]:=f[y1[i]]+lb1[i];
      f[y2[i]]:=f[y2[i]]-mb1[i];
      f[y3[i]]:=f[y3[i]]+lb2[i];
      f[y4[i]]:=f[y4[i]]+mb2[i];
      end;
  end;

  (*Goi chuong trinh con de giai he FT*);
  GHFT(s,f,qq,sbt);

  (*Tinh mo men*);
  if (W<>0) then for i:=1 to w do qq[d[i]]:=0;
  for i:=1 to st do
  begin
  if  (sqr(cd[i])<>0) then
  z1[i]:=(6*e[i]*mq[i]/sqr(cd[i]))*(qq[d3[i]]-qq[d1[i]]);
  if(cd[i]<>0) then
  m1[i]:=z1[i]+(e[i]*mq[i]/cd[i])*(4*qq[d2[i]]+2*qq[d4[i]]);
  m2[i]:=z1[i]+(e[i]*mq[i]/cd[i])*(2*qq[d2[i]]+4*qq[d4[i]]);
  end;
 (*tinh tong mo men*);
  if (x<>0) then
  begin
  for i:=1 to x do
  begin
   m1x[i]:=m1[a[i]]+ma[i];
   m2x[i]:=m2[a[i]]-ma[i];
 end;
 end;
 if (y<>0) then
 begin
 for i:=1 to y do
 begin
   m1y[i]:=m1[b[i]]+mb1[i];
   m2y[i]:=m2[b[i]]-mb2[i];
end;
```

```
end;
if(z<>0) then
begin
for i:=1 to z do
begin
m1z[i]:=m1[c[i]];      m2z[i]:=m2[c[i]];
end;
end;

(*Tinh luc cat*);
if (x<>0) then
begin
for i :=1 to x do
begin
 l1x[i]:=-(m1x[i]+m2x[i])/cd[a[i]]-la[i];
 l2x[i]:=(m1x[i]+m2x[i])/cd[a[i]]-la[i];
end;
end;
if (y<>0) then
begin
 for i :=1 to y do
  begin
    l1y[i]:=-(m1y[i]+m2y[i])/cd[b[i]]-lb1[i];
    l2y[i]:= (m1y[i]+m2y[i])/cd[b[i]]-lb2[i];
  end;
end;
if(z<>0) then
begin
for i:=1 to z do
begin
l1z[i]:=-(m1z[i]+m2z[i])/cd[c[i]]; l2z[i]:=(m1z[i]+m2z[i])/cd[c[i]];
end;
end;

(*Doc ket qua*);
writeln('gia tri chuyen vi la');
for i:=1 to sbt do
writeln(qq[i]);
writeln('gia tri mo men x');
if(x<>0) then
begin
for i:=1 to x do
writeln (m1x[i],m2x[i]);
end;
```

```
writeln('gia tri mo men y');
if(y<>0) then
begin
for i:=1 to y do
writeln (m1y[i],m2y[i]);
end;
writeln('gia tri mo men z');
if(z<>0) then
begin
for i:=1 to z do
writeln (m1z[i],m2z[i]);
end;
writeln('gia tri luc cat x');
if(x<>0) then
begin
for i:=1 to x do
writeln (l1x[i],l2x[i]);
end;
writeln('gia tri luc cat y');
if(y<>0) then
begin
for i:=1 to y do
writeln (l1y[i],l2y[i]);
end;
writeln('gia tri luc cat z');
if(z<>0) then
begin
for i:=1 to z do
writeln (l1z[i],l2z[i]);
end;
readln;
end.
```

```
Program CTR12_Tinh_dam_lien_tuc_tren_goi_tua_lun_theo_FF_mo_hinh_lo_xo;
 uses crt;
type mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
    mt3=array[1..20]of integer;
Var i,j, k,sn,st,sbt,tbt,ss,rr,x,y,z,w,v,sgc:integer;
 a1,b1,p,q1,e,f,fc,mq,qq,l,m,m1,m2,cd,cd3,dt,c1,c2,c3,c4,lc1,lc2,m1x,m2x,
 m1y,m2y,m1z,m2z,l1x,l2x,l1y,l2y,l1z,l2z,mb1,mb2,ma,la,lb1,lb2,z1,hc,
 max,cv:mt2;
 n1,n2,a,b,c,d,dd,e1,d1,d2,d3,d4,x1,x2,x3,x4,y1,y2,y3,y4,tgc:mt3;
 s:mt1;  q,r,cc,maxx:real;

procedure gtcdtd(a:mt1;n:integer);
begin
 max[i]:=abs(a[i,1]);
for i:=1 to n do
for j:=2 to n do
begin
if ((abs(a[i,j])>max[i]) or (abs(a[i,j])=max[i]))  then
 max[i]:=abs(a[i,j]) else max[i]:=max[i] ;
end;
 maxx:=max[1];
for i:=2 to n do
begin
 if(max[i]>maxx) then
 maxx:=max[i] else maxx:=maxx ;
end;
end;

 Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
 var     i,j,k,s:integer; q,r:real ;
 begin
  s:=0;
  REPEAT
      s:=s+1;
      for i:= s+1 to n do
        Begin
          if(a[s,s]<>0) then
          q:=a[s,i]/a[s,s];
          for j:=i to n do
           a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
        End
   UNTIL(s= n -1);
    x[n]:=b[n]/a[n,n];
    for i:= n -1  downto 1 do
```

```
    Begin
      r :=0;
      for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
      if(a[i,i]<>0) then
      x[i]:= (b[i]-r)/ a[i,i];
    End;
end;

begin   clrscr;
(*Nguoi lap trinh:Vo nhu Cau*);
writeln('nhap tong so BTD');
readln(tbt);
writeln('nhap so thanh');
readln(st);
writeln('nhap so bac tu do co chuyen vi cho truoc');
readln(sgc);
writeln('nhap so thu tu bac tu do co chuyen vi cho truoc');
if(sgc<>0) then for i:=1 to sgc do  readln(tgc[i]);
writeln('nhap gia tri chuyen vi cho cho truoc');
if(sgc<>0) then for i:=1 to sgc do  readln(cv[tgc[i]]);
writeln('nhap chieu dai thanh');
for i :=1 to st do   readln(cd[i]);
writeln ('nhap so thanh chiu tai trong fan bo deu');
readln (x);
writeln ('nhap so thanh chiu tai trong tap trung');
readln(y);
writeln ('nhap so thanh khong chiu tai trong ');
readln(z);
if(x<>0) then
begin
writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
for i:=1 to x do
readln (a[i]);
writeln('nhap cuong do tai trong fan bo deu');
for i:=1 to x do
readln (q1[i]);
end;
if (y<>0)then
begin
writeln('nhap so thu tu thanh chiu tai trong tap trung');
for i:=1 to y do     readln (b[i]);
writeln('nhap tai trong tap trung');
for i:= 1 to y do  readln (p[i]);
writeln('nhap a1');
for i:= 1 to y do  readln (a1[i]);
```

```
 writeln('nhap b1');
 for i:= 1 to y do readln (b1[i]);
end;
 writeln('nhap so thu tu thanh khong chiu tai trong ');
 if (z<>0) then   for i:=1 to z do readln(c[i]);
 writeln('nhap mo dun dan hoi');  for i:=1 to st do readln(e[i]);
writeln('nhap mo men quan tinh');  for i:=1 to st do readln(mq[i]);
writeln('nhap BTD d1');  for i:=1 to st do readln(d1[i]);
writeln('nhap BTD d2 ');  for i:=1 to st do readln(d2[i]);
writeln('nhap BTD d3');  for i:=1 to st do readln(d3[i]);
writeln('nhap BTD d4');  for i:=1 to st do readln(d4[i]);

(*Ghep cac MTDC rieng vao MTDC tong the*);
 for i:=1 to st do
begin
    cd3[i]:=sqr(cd[i])*cd[i];
    if(((cd3[i]<>0)and(sqr(cd[i])<>0))and(cd[i]<>0)) then
    begin
    c1[i]:=12*e[i]*mq[i]/cd3[i];  c2[i]:=-6*e[i]*mq[i]/sqr(cd[i]);
    c3[i]:=4*e[i]*mq[i]/cd[i];    c4[i]:=2*e[i]*mq[i]/cd[i];
    end;
end;
for i:=1 to st do
begin
 s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
 s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
 s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
 s[d1[i],d3[i]]:=s[d1[i],d3[i]]-c1[i];
 s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c2[i];
 s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c1[i];
 s[d1[i],d4[i]]:=s[d1[i],d4[i]]+c2[i];
 s[d2[i],d4[i]]:=s[d2[i],d4[i]]+c4[i];
 s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c2[i];
 s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c3[i];
end;
 for i:=1 to tbt do
 for j:=1 to i-1 do   s[i,j]:=s[j,i];

 (*Goi chuong trinh con de tinh tdmax cua cac fan tu MT*);
 GTCDTD(s,tbt);
 cc:=(maxx)*10E+08;
 if(sgc<>0) then  for i:=1 to sgc do
 s[tgc[i],tgc[i]]:=s[tgc[i],tgc[i]]+cc;
 (*Ghep cac vecto tai trong*);
 if (x<>0)then
```

```
 begin
  for i:=1 to x do
  begin
  la[i]:= q1[i]*cd[a[i]]/2;    ma[i]:=(q1[i]*sqr(cd[a[i]])/12);
  x1[i]:=d1[a[i]];          x2[i]:=d2[a[i]];          x3[i]:=d3[a[i]];
  x4[i]:=d4[a[i]];
  f[x1[i]]:=f[x1[i]]+la[i];
  f[x2[i]]:=f[x2[i]]-ma[i];
  f[x3[i]]:=f[x3[i]]+la[i];
  f[x4[i]]:=f[x4[i]]+ma[i];
  end;
 end;
 if (y<>0) then
 begin
 for i:=1 to y do
  begin
    cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; if(cd3[i]<>0) then
    lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i]; lb2[i]:=p[i]-lb1[i];
    mb1[i]:=(p[i]*a1[i]*sqr(b1[i])/sqr(cd[b[i]]));
    mb2[i]:=(p[i]*b1[i]*sqr(a1[i])/sqr(cd[b[i]]));
    y1[i]:=d1[b[i]];          y2[i]:=d2[b[i]];          y3[i]:=d3[b[i]];
    y4[i]:=d4[b[i]];
    if (cd3[i]<>0) then
    f[y1[i]]:=f[y1[i]]+lb1[i];
    f[y2[i]]:=f[y2[i]]-mb1[i];
    f[y3[i]]:=f[y3[i]]+lb2[i];
    f[y4[i]]:=f[y4[i]]+mb2[i];
  end;
 end;
 if (sgc<>0) then for i:=1 to sgc do
 f[tgc[i]]:= f[tgc[i]]+cc*cv[tgc[i]];

 (*Goi chuong trinh con de giai he FT*);
 GHFT(s,f,qq,tbt);

 (*Tinh mo men*);
 if (W<>0) then for i:=1 to w do qq[d[i]]:=0;
 for i:=1 to st do
 begin
 if  (sqr(cd[i])<>0) then
 z1[i]:=(6*e[i]*mq[i]/sqr(cd[i]))*(qq[d3[i]]-qq[d1[i]]);
 if(cd[i]<>0) then
 m1[i]:=z1[i]+(e[i]*mq[i]/cd[i])*(4*qq[d2[i]]+2*qq[d4[i]]);
 m2[i]:=z1[i]+(e[i]*mq[i]/cd[i])*(2*qq[d2[i]]+4*qq[d4[i]]);
 end;
```

```
(*tinh tong mo men*);
 if (x<>0) then
 begin
 for i:=1 to x do
 begin
  m1x[i]:=m1[a[i]]+ma[i];
  m2x[i]:=m2[a[i]]-ma[i];
 end;
 end;
 if (y<>0) then
 begin
 for i:=1 to y do
 begin
   m1y[i]:=m1[b[i]]+mb1[i];
   m2y[i]:=m2[b[i]]-mb2[i];
 end;
 end;
 if(z<>0) then
 begin
 for i:=1 to z do
 begin
 m1z[i]:=m1[c[i]];      m2z[i]:=m2[c[i]];
 end;
 end;

 (*Tinh luc cat*);
 if (x<>0) then
 begin
 for i :=1 to x do
 begin
  l1x[i]:=-(m1x[i]+m2x[i])/cd[a[i]]-la[i];
  l2x[i]:=(m1x[i]+m2x[i])/cd[a[i]]-la[i];
 end;
 end;
 if (y<>0) then
 begin
  for i :=1 to y do
   begin
     l1y[i]:=-(m1y[i]+m2y[i])/cd[b[i]]-lb1[i];
     l2y[i]:= (m1y[i]+m2y[i])/cd[b[i]]-lb2[i];
   end;
 end;
 if(z<>0) then
 begin
 for i:=1 to z do
```

```
 begin
 l1z[i]:=-(m1z[i]+m2z[i])/cd[c[i]]; l2z[i]:=(m1z[i]+m2z[i])/cd[c[i]];
 end;
 end;

(*Doc ket qua*);
writeln('gia tri chuyen vi la');
for i:=1 to tbt do
writeln(qq[i]);
writeln('gia tri mo men x');
if(x<>0) then
begin
for i:=1 to x do
writeln (m1x[i],m2x[i]);
end;
writeln('gia tri mo men y');
if(y<>0) then
begin
for i:=1 to y do
writeln (m1y[i],m2y[i]);
end;
writeln('gia tri mo men z');
if(z<>0) then
begin
for i:=1 to z do
writeln (m1z[i],m2z[i]);
end;
writeln('gia tri luc cat x');
if(x<>0) then
begin
for i:=1 to x do
writeln (l1x[i],l2x[i]);
end;
writeln('gia tri luc cat y');
if(y<>0) then
begin
for i:=1 to y do
writeln (l1y[i],l2y[i]);
end;
writeln('gia tri luc cat z');
if(z<>0) then
begin
for i:=1 to z do
writeln (l1z[i],l2z[i]);
end;
readln;
end.
```

```
Program CTR13_Giai_gan_dung_bai_toan_us_fang_kieu_FTHH_bon_canh_bon_nut;
Uses crt;
Type   mt1=array [1..15,1..15] of real; mt2=array [1..15] of real;
     mt3= array[1..15] of integer;
Var    d1,d2,d3,d4,d5,d6,d7,d8,u:mt3;
     f,fl,fb,ft,fn,x1,x2,x3,x4,y1,y2,y3,y4,qq,dt,det1,det2,det3,det4,

us1,us2,us3,k11,k12,k21,k22;z1,z1a,z1b,z1c,z1d,z3,z3a,z3b,z3c,z3d,z5,z5a,z5b,z5c,z5d,
     z7,z7a,z7b,z7c,z7d:mt2;
     i,j,k,ss,sf,sbt,tbt,x,p:integer;  q,hp,tx,ty,e,e1,e2,e3,et,kx,w,
     t:real;
     s,b1,b2,b3,b4,b1c,b2c,b3c,b4c,d,h1,h2,h3,h4,l1,l2,l3,l4,a1,a2,a3,a4,
     g1,g2,g3,g4,r,ja,jb,jc,jd:mt1;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var    i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
    s:=s+1;
    for i:= s+1 to n do
      Begin
       if(a[s,s]<>0) then
       q:=a[s,i]/a[s,s];
       for j:=i to n do
        a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
      End
  UNTIL(s= n -1);
  if(a[n,n]<>0) then
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
 end;
 procedure tinhl1;
 begin
 for k:=1 to sf do
 begin
 for i:=1 to 2 do
 for i:=1 to 2 do
```

```
begin
 ja[1,1]:=(-(1-w)*x1[k]+(1-w)*x2[k]+(1+w)*x3[k]-(1+w)*x4[k])/4;
 ja[1,2]:=(-(1-w)*y1[k]+(1-w)*y2[k]+(1+w)*y3[k]-(1+w)*y4[k])/4;
 ja[2,1]:=(-(1-w)*x1[k]-(1+w)*x2[k]+(1+w)*x3[k]+(1-w)*x4[k])/4;
 ja[2,2]:=(-(1-w)*y1[k]-(1+w)*y2[k]+(1+w)*y3[k]+(1-w)*y4[k])/4;
end;
det1[k]:=ja[1,1]*ja[2,2]-ja[1,2]*ja[2,1];
for i:=1 to 4 do
for j:=1 to 8 do
begin
g1[1,1]:=-(1-w)/4;  g1[1,2]:=0;      g1[1,3]:=(1+w)/4;      g1[1,4]:=0;
g1[1,5]:=(1+w)/4;   g1[1,6]:=0;      g1[1,7]:=-(1+w)/4;     g1[1,8]:=0;
g1[2,1]:=-(1-w)/4;  g1[2,2]:=0;      g1[2,3]:=-(1+w)/4;     g1[2,4]:=0;
g1[2,5]:=(1+w)/4;   g1[2,6]:=0;      g1[2,7]:=(1-w)/4;    g1[2,8]:=0;
g1[3,1]:=0;       g1[3,2]:=-(1-w)/4;  g1[3,3]:=0;        g1[3,4]:=(1-w)/4;
g1[3,5]:=0;       g1[3,6]:=(1+w)/4;    g1[3,7]:=0;      g1[3,8]:=-(1+w)/4;
g1[4,1]:=0;       g1[4,2]:=-(1-w)/4;  g1[4,3]:=0;       g1[4,4]:=-(1+w)/4;
g1[4,5]:=0;       g1[4,6]:=(1+w)/4;    g1[4,7]:=0;      g1[4,8]:=(1-w)/4;
end;
for i:=1 to 3 do
for j:=1 to 4 do
begin
a1[1,1]:=ja[2,2]/det1[k];     a1[1,2]:=-ja[1,2]/det1[k];
a1[1,3]:=0;                   a1[1,4]:=0;
a1[2,1]:=0;                   a1[2,2]:=0;
a1[2,3]:=-ja[2,1]/det1[k];    a1[2,4]:=ja[1,1]/det1[k];
a1[3,1]:=-ja[2,1]/det1[k];    a1[3,2]:=ja[1,1]/det1[k];
a1[3,3]:=ja[2,2]/det1[k];     a1[3,4]:=-ja[1,2]/det1[k];
end;
  for i:=1 to 3 do
  for j:=1 to 8 do
  begin
  b1[i,j]:=0;  for p :=1 to 4 do
  b1[i,j]:=b1[i,j]+a1[i,p]*g1[p,j];
  end;
  for i:=1 to 3 do
  for j:=i to 3 do
  begin  d[1,1]:=e/(1-sqr(hp)); d[1,2]:= e*hp/(1-sqr(hp)); d[1,3]:=0;
  d[2,2]:=d[1,1]; d[2,3]:=0; d[3,3]:=e*(1-hp)/2*(1-sqr(hp));
  end;
  for i:=1 to 3 do
  for j:=1 to i-1 do  d[i,j]:=d[j,i];
  for i:=1 to 8 do
  for j:=1 to 3 do   b1c[i,j]:=b1[j,i];
```

```
 for  i:=1 to 8 do
 for j:=1 to 3 do
 begin  h1[i,j]:=0; for p:=1 to 3 do
 h1[i,j]:=h1[i,j]+b1c[i,p]*d[p,j];
 end;
 for i:=1 to 8 do
 for j:=1 to 8 do
 begin
 l1[i,j]:=0;  for p:=1 to 3 do
 l1[i,j]:=l1[i,j]+(h1[i,p]*b1[p,j])*t*det1[k];
 end;
end;
end;
procedure tinhl2;
begin
for k:=1 to sf do
begin
  for i :=1 to 2 do
  for j :=1 to 2 do
  begin
 jb[1,1]:=(-(1-w)*x1[k]+(1-w)*x2[k]+(1+w)*x3[k]-(1+w)*x4[k])/4;
 jb[1,2]:=-((1-w)*y1[k]+(1-w)*y2[k]+(1+w)*y3[k]-(1+w)*y4[k])/4;
 jb[2,1]:=-((1+w)*x1[k]-(1-w)*x2[k]+(1-w)*x3[k]+(1+w)*x4[k])/4;
 jb[2,2]:=-((1+w)*y1[k]-(1-w)*y2[k]+(1-w)*y3[k]+(1+w)*y4[k])/4;
 end;
 det2[k]:=jb[1,1]*jb[2,2]-jb[1,2]*jb[2,1];
for i:=1 to 4 do
for j:=1 to 8 do
begin
g2[1,1]:=-(1-w);  g2[1,2]:=0;      g2[1,3]:=(1-w)/4;      g2[1,4]:=0;
g2[1,5]:=1+w;     g2[1,6]:=0;      g2[1,7]:=-(1+w)/4;     g2[1,8]:=0;
g2[2,1]:=-(1+w);  g2[2,2]:=0;      g2[2,3]:=-(1-w)/4;     g2[2,4]:=0;
g2[2,5]:=1-w;     g2[2,6]:=0;      g2[2,7]:=(1+w)/4;      g2[2,8]:=0;
g2[3,1]:=0;       g2[3,2]:=-(1-w)/4;  g2[3,3]:=0;         g2[3,4]:=(1-w)/4;
g2[3,5]:=0;       g2[3,6]:=(1+w)/4;   g2[3,7]:=0;         g2[3,8]:=-(1+w)/4;
g2[4,1]:=0;       g2[4,2]:=-(1+w)/4;  g2[4,3]:=0;         g2[4,4]:=-(1-w)/4;
g2[4,5]:=0;       g2[4,6]:=(1-w)/4;   g2[4,7]:=0;         g2[4,8]:=(1+w)/4;
end;
for i:=1 to 3 do
for j:=1 to 4 do
begin
a2[1,1]:=jb[2,2]/det2[k];     a2[1,2]:=-jb[1,2]/det2[k];
a2[1,3]:=0;                   a2[1,4]:=0;
a2[2,1]:=0;                   a2[2,2]:=0;
```

```
  a2[2,3]:=-jb[2,1]/det2[k];     a2[2,4]:=jb[1,1]/det2[k];
  a2[3,1]:=-jb[2,1]/det2[k];     a2[3,2]:=jb[1,1]/det2[k];
  a2[3,3]:=jb[2,2]/det2[k];      a2[3,4]:=-jb[1,2]/det2[k];
  end;
    for i:=1 to 3 do
    for j:=1 to 8 do
    begin
    b2[i,j]:=0;  for p :=1 to 4 do
    b2[i,j]:=b2[i,j]+a2[i,p]*g2[p,j];
    end;
    for i:=1 to 3 do
    for j:=i to 3 do
    begin  d[1,1]:=e/(1-sqr(hp)); d[1,2]:= e*hp/(1-sqr(hp)); d[1,3]:=0;
    d[2,2]:=d[1,1]; d[2,3]:=0; d[3,3]:=e*(1-hp)/2*(1-sqr(hp));
    end;
    for i:=1 to 3 do
    for j:=1 to i-1 do       d[i,j]:=d[j,i];
    for i:=1 to 8 do
    for j:=1 to 3 do         b2c[i,j]:=b2[j,i];
    for  i:=1 to 8 do
    for j:=1 to 3 do
    begin   h2[i,j]:=0; for p:=1 to 3 do
    h2[i,j]:=h2[i,j]+b2c[i,p]*d[p,j];
    end;
    for i:=1 to 8 do
    for j:=1 to 8 do
    begin
    l2[i,j]:=0;   for p:=1 to 3 do
    l2[i,j]:=l2[i,j]+(h2[i,p]*b2[p,j])*t*det2[k];
    end;
 end;
 end;
 procedure  tinhl3;
 begin
 for k:=1 to sf do
 begin
 for i:=1 to 2 do
 for j:=1 to 2 do
 begin
 jc[1,1]:=-((1+w)*x1[k]+(1+w)*x2[k]+(1-w)*x3[k]-(1-w)*x4[k])/4;
 jc[1,2]:=-((1+w)*y1[k]+(1+w)*y2[k]+(1-w)*y3[k]-(1-w)*y4[k])/4;
 jc[2,1]:=-((1-w)*x1[k]-(1+w)*x2[k]+(1+w)*x3[k]+(1-w)*x4[k])/4;
 jc[2,2]:=-((1-w)*y1[k]-(1+w)*y2[k]+(1+w)*y3[k]+(1-w)*y4[k])/4;
end;
```

```
det3[k]:=jc[1,1]*jc[2,2]-jc[1,2]*jc[2,1];
for i:=1 to 4 do
for j:=1 to 8 do
begin
g3[1,1]:=-(1+w); g3[1,2]:=0;      g3[1,3]:=(1+w)/4;      g3[1,4]:=0;
g3[1,5]:=1-w;    g3[1,6]:=0;      g3[1,7]:=-(1-w)/4;     g3[1,8]:=0;
g3[2,1]:=-(1-w); g3[2,2]:=0;      g3[2,3]:=-(1+w)/4;     g3[2,4]:=0;
g3[2,5]:=1+w;    g3[2,6]:=0;      g3[2,7]:=(1-w)/4;      g3[2,8]:=0;
g3[3,1]:=0;      g3[3,2]:=-(1+w)/4; g3[3,3]:=0;          g3[3,4]:=(1+w)/4;
g3[3,5]:=0;      g3[3,6]:=(1-w)/4;  g3[3,7]:=0;          g3[3,8]:=-(1-w)/4;
g3[4,1]:=0;      g3[4,2]:=-(1-w)/4; g3[4,3]:=0;          g3[4,4]:=-(1+w)/4;
g3[4,5]:=0;      g3[4,6]:=(1+w)/4;  g3[4,7]:=0;          g3[4,8]:=(1-w)/4;
end;
for i:=1 to 3 do
for j:=1 to 4 do
begin
a3[1,1]:=jc[2,2]/det3[k];     a3[1,2]:=-jc[1,2]/det3[k];
a3[1,3]:=0;                   a3[1,4]:=0;
a3[2,1]:=0;                   a3[2,2]:=0;
a3[2,3]:=-jc[2,1]/det3[k];    a3[2,4]:=jc[1,1]/det3[k];
a3[3,1]:=-jc[2,1]/det3[k];    a3[3,2]:=jc[1,1]/det3[k];
a3[3,3]:=jc[2,2]/det3[k];     a3[3,4]:=-jc[1,2]/det3[k];
end;
  for i:=1 to 3 do
  for j:=1 to 8 do
  begin
  b3[i,j]:=0;  for p :=1 to 4 do
  b3[i,j]:=b3[i,j]+a3[i,p]*g3[p,j];
  end;
  for i:=1 to 3 do
  for j:=i to 3 do
  begin  d[1,1]:=e/(1-sqr(hp)); d[1,2]:= e*hp/(1-sqr(hp)); d[1,3]:=0;
  d[2,2]:=d[1,1]; d[2,3]:=0; d[3,3]:=e*(1-hp)/2*(1-sqr(hp));
  end;
  for i:=1 to 3 do
  for j:=1 to i-1 do       d[i,j]:=d[j,i];
  for i:=1 to 8 do
  for j:=1 to 3 do         b3c[i,j]:=b3[j,i];
  for  i:=1 to 8 do
  for j:=1 to 3 do
  begin   h3[i,j]:=0; for p:=1 to 3 do
  h3[i,j]:=h3[i,j]+b3c[i,p]*d[p,j];
  end;
  for i:=1 to 8 do
```

```
    for j:=1 to 8 do
    begin
    l3[i,j]:=0;   for p:=1 to 3 do
    l3[i,j]:=l3[i,j]+(h3[i,p]*b3[p,j])*t*det3[k];
    end;
  end;
  end;
  procedure  tinhl4;
  begin
  for k:=1 to sf do
  begin
  for i:=1 to 2 do
  for j:=1 to 2 do
  begin
   jd[1,1]:=(-(1+w)*x1[k]+(1+w)*x2[k]+(1-w)*x3[k]-(1-w)*x4[k])/4;
   jd[1,2]:=(-(1+w)*y1[k]+(1+w)*y2[k]+(1-w)*y3[k]-(1-w)*y4[k])/4;
   jd[2,1]:=(-(1+w)*x1[k]-(1-w)*x2[k]+(1-w)*x3[k]+(1+w)*x4[k])/4;
   jd[2,2]:=(-(1+w)*y1[k]-(1-w)*y2[k]+(1-w)*y3[k]+(1+w)*y4[k])/4;
  end;
   det4[k]:=jd[1,1]*jd[2,2]-jd[1,2]*jd[2,1];
  for i:=1 to 4 do
  for j:=1 to 8 do
  begin
  g4[1,1]:=-(1+w); g4[1,2]:=0;      g4[1,3]:=(1+w)/4;      g4[1,4]:=0;
  g4[1,5]:=1-w;    g4[1,6]:=0;      g4[1,7]:=-(1-w)/4;    g4[1,8]:=0;
  g4[2,1]:=-(1+w); g4[2,2]:=0;      g4[2,3]:=-(1-w)/4;    g4[2,4]:=0;
  g4[2,5]:=1-w;    g4[2,6]:=0;      g4[2,7]:=(1+w)/4;      g4[2,8]:=0;
  g4[3,1]:=0;      g4[3,2]:=-(1+w)/4; g4[3,3]:=0;         g4[3,4]:=(1+w)/4;
  g4[3,5]:=0;      g4[3,6]:=(1-w)/4;    g4[3,7]:=0;       g4[3,8]:=-(1-w)/4;
  g4[4,1]:=0;      g4[4,2]:=-(1+w)/4; g4[4,3]:=0;         g4[4,4]:=-(1-w)/4;
  g4[4,5]:=0;      g4[4,6]:=(1-w)/4;    g4[4,7]:=0;       g4[4,8]:=(1+w)/4;
  end;
  for i:=1 to 3 do
  for j:=1 to 4 do
  begin
  a4[1,1]:=jd[2,2]/det4[k];     a4[1,2]:=-jd[1,2]/det4[k];
  a4[1,3]:=0;                   a4[1,4]:=0;
  a4[2,1]:=0;                   a4[2,2]:=0;
  a4[2,3]:=-jd[2,1]/det4[k];    a4[2,4]:=jd[1,1]/det4[k];
  a4[3,1]:=-jd[2,1]/det4[k];    a4[3,2]:=jd[1,1]/det4[k];
  a4[3,3]:=jd[2,2]/det4[k];     a4[3,4]:=-jd[1,2]/det4[k];
  end;
    for i:=1 to 3 do
    for j:=1 to 8 do
```

```
begin
b4[i,j]:=0;  for p:=1 to 4 do
b4[i,j]:=b4[i,j]+a4[i,p]*g4[p,j];
end;
for i:=1 to 3 do
for j:=i to 3 do
begin  d[1,1]:=e/(1-sqr(hp)); d[1,2]:= e*hp/(1-sqr(hp)); d[1,3]:=0;
d[2,2]:=d[1,1]; d[2,3]:=0; d[3,3]:=e*(1-hp)/2*(1-sqr(hp));
end;
for i:=1 to 3 do
for j:=1 to i-1 do       d[i,j]:=d[j,i];
for i:=1 to 8 do
for j:=1 to 3 do         b4c[i,j]:=b4[j,i];
for  i:=1 to 8 do
for j:=1 to 3 do
begin   h4[i,j]:=0; for p:=1 to 3 do
h4[i,j]:=h4[i,j]+b4c[i,p]*d[p,j];
end;
for i:=1 to 8 do
for j:=1 to 8 do
begin
l4[i,j]:=0;   for p:=1 to 3 do
l4[i,j]:=l4[i,j]+(h4[i,p]*b4[p,j])*t*det4[k];
end;
end;
end;
procedure tinhs;
begin
(*Ghep cac MTDC rieng vao MTDC tong the*);
for i:=1 to sf do
begin
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+r[1,1];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+r[1,2];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+r[1,3];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]+r[1,4];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]+r[1,5];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+r[1,6];
  s[d1[i],d7[i]]:=s[d1[i],d7[i]]+r[1,7];
  s[d1[i],d8[i]]:=s[d1[i],d8[i]]+r[1,8];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+r[2,2];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]+r[2,3];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]+r[2,4];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]+r[2,5];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]+r[2,6];
```

```
    s[d2[i],d7[i]]:=s[d2[i],d7[i]]+r[2,7];
    s[d2[i],d8[i]]:=s[d2[i],d8[i]]+r[2,8];
    s[d3[i],d3[i]]:=s[d3[i],d3[i]]+r[3,3];
    s[d3[i],d4[i]]:=s[d3[i],d4[i]]+r[3,4];
    s[d3[i],d5[i]]:=s[d3[i],d5[i]]+r[3,5];
    s[d3[i],d6[i]]:=s[d3[i],d6[i]]+r[3,6];
    s[d3[i],d7[i]]:=s[d3[i],d7[i]]+r[3,7];
    s[d3[i],d8[i]]:=s[d3[i],d8[i]]+r[3,8];
    s[d4[i],d4[i]]:=s[d4[i],d4[i]]+r[4,4];
    s[d4[i],d5[i]]:= s[d4[i],d5[i]]+r[4,5];
    s[d4[i],d6[i]]:=s[d4[i],d6[i]]+r[4,6];
    s[d4[i],d7[i]]:= s[d4[i],d7[i]]+r[4,7];
    s[d4[i],d8[i]]:=s[d4[i],d8[i]]+r[4,8];
    s[d5[i],d5[i]]:=s[d5[i],d5[i]]+r[5,5];
    s[d5[i],d6[i]]:=s[d5[i],d6[i]]+r[5,6];
    s[d5[i],d7[i]]:=s[d5[i],d7[i]]+r[5,7];
    s[d5[i],d8[i]]:=s[d5[i],d8[i]]+r[5,8];
    s[d6[i],d6[i]]:=s[d6[i],d6[i]]+r[6,6];
    s[d6[i],d7[i]]:=s[d6[i],d7[i]]+r[6,7];
    s[d6[i],d8[i]]:=s[d6[i],d8[i]]+r[6,8];
    s[d7[i],d7[i]]:=s[d7[i],d7[i]]+r[7,7];
    s[d7[i],d8[i]]:=s[d7[i],d8[i]]+r[7,8];
    s[d8[i],d8[i]]:=s[d8[i],d8[i]]+r[8,8];
  end;
  end;
procedure tinhus;
begin
(*Tinh ung suat tai trong tam cua FTHH*);
if(x<>0) then for i:=1 to x do  qq[u[i]]:=0;
for i:=1 to sf do
begin
k11[i]:=-x1[i]+x2[i]+x3[i]-x4[i];  k12[i]:=-y1[i]+y2[i]+y3[i]-y4[i];
k21[i]:=-x1[i]-x2[i]+x3[i]+x4[i];  k22[i]:=-y1[i]-y2[i]+y3[i]+y4[i];
 us1[i]:=e1*(-k22[i]+k12[i])*qq[d1[i]]+e2*(k21[i]-k11[i])*qq[d2[i]]+
e1*(k22[i]+k12[i])*qq[d3[i]]-e2*(k21[i]+k11[i])*qq[d4[i]]+
e1*(k22[i]-k12[i])*qq[d5[i]]+ e2*(-k21[i]+k11[i])*qq[d6[i]]-
e1*(k22[i]+k12[i])*qq[d7[i]]+ e2*(k21[i]+k11[i])*qq[d8[i]];
us2[i]:=e2*(-k22[i]+k12[i])*qq[d1[i]]+e1*(k21[i]-k11[i])*qq[d2[i]]+
e2*(k22[i]+k12[i])*qq[d3[i]]-e1*(k21[i]+k11[i])*qq[d4[i]]-
e2*(k22[i]+k12[i])*qq[d5[i]]+ e1*(-k21[i]+k11[i])*qq[d6[i]]-
e2*(k22[i]+k12[i])*qq[d7[i]]+ e1*(k21[i]+k11[i])*qq[d8[i]];
us3[i]:=e3*(k21[i]-k11[i])*qq[d1[i]]+e3*(-k22[i]+k12[i])*qq[d2[i]]+
e3*(k21[i]-k11[i])*qq[d3[i]]+e3*(k22[i]+k12[i])*qq[d4[i]]+
e3*(-k21[i]+k11[i])*qq[d5[i]]+e3*(k22[i]-k12[i])*qq[d6[i]]+
```

```
 e3*(k21[i]+k11[i])*qq[d7[i]]-e3*(k22[i]+k12[i])*qq[d8[i]];
end;
end;

begin clrscr;
(*Nguoi lap trinh:Vo nhu Cau*);
 writeln('so fan tu');
 readln(sf);
 writeln('nhap so BTD co chuyen vi');
 readln(sbt);
 writeln('nhap tong so so BTD ');
 readln(tbt);
 writeln('nhap so BTD co chuyen vi triet tieu ');
 readln(x);
 writeln('nhap so thu tu BTD co chuyen vi triet tieu ');
 if(x<>0) then for i:=1 to x do
 readln(u[i]);
 writeln('btd d1'); for i :=1 to sf do  readln(d1[i]);
 writeln('btd d2'); for i :=1 to sf do  readln(d2[i]);
 writeln('btd d3'); for i :=1 to sf do  readln(d3[i]);
 writeln('btd d4'); for i :=1 to sf do  readln(d4[i]);
 writeln('btd d5'); for i :=1 to sf do  readln(d5[i]);
 writeln('btd d6'); for i :=1 to sf do  readln(d6[i]);
 writeln('btd d7'); for i :=1 to sf do  readln(d7[i]);
 writeln('btd d8'); for i :=1 to sf do  readln(d8[i]);
 writeln('toa do x1'); for i :=1 to sf do  readln(x1[i]);
 writeln('toa do x2'); for i :=1 to sf do  readln(x2[i]);
 writeln('toa do x3'); for i :=1 to sf do  readln(x3[i]);
 writeln('toa do x4'); for i :=1 to sf do  readln(x4[i]);
 writeln('toa do y1'); for i :=1 to sf do  readln(y1[i]);
 writeln('toa do y2'); for i :=1 to sf do  readln(y2[i]);
 writeln('toa do y3'); for i :=1 to sf do  readln(y3[i]);
 writeln('toa do y4'); for i :=1 to sf do  readln(y4[i]);
 writeln('nhap modun dan hoi');
 readln(e);
  writeln('nhap be day tam');
 readln(t);
 writeln('nhap he so Poatxong');
 readln(hp);
 writeln('nhap ti trong tren fuong x');
 readln(tx);
 writeln('nhap ti trong tren fuong y');
 readln(ty);
 writeln('nhap luc bien');
```

```
  for i:=1 to sbt do  readln(fb[i]);
  writeln('nhap thanh fan ngoai luc');
  for i:=1 to sbt do  readln(fn[i]);
  w:=0.5773502691;  e1:=e/(1-hp);  e2:=e1*hp;   e3:=e1*(1-hp)/2;
 tinhl1;
 tinhl2;
 tinhl3;
 tinhl4;
 for k:=1 to sf do
 begin
 for i:=1 to 8 do
 for j:=i to 8 do  r[i,j]:=l1[i,j]+l2[i,j]+l3[i,j]+l4[i,j];
 end;
 tinhs;
  for i:=1 to sbt do
  for j:=1 to i-1 do     s[i,j]:=s[j,i];

 for k:=1 to sf do
 begin
 z1a[k]:=(1-w)*(1-w)*det1[k];
 z1b[k]:=(1+w)*(1-w)*det2[k];
 z1c[k]:=(1-w)*(1+w)*det3[k];
 z1d[k]:=(1+w)*(1+w)*det4[k];

 z3a[k]:=(1+w)*(1-w)*det1[k];
 z3b[k]:=(1-w)*(1-w)*det2[k];
 z3c[k]:=(1+w)*(1+w)*det3[k];
 z3d[k]:=(1-w)*(1+w)*det4[k];

 z5a[k]:=(1+w)*(1+w)*det1[k];
 z5b[k]:=(1-w)*(1+w)*det2[k];
 z5c[k]:=(1+w)*(1-w)*det3[k];
 z5d[k]:=(1-w)*(1-w)*det4[k];
 z7a[k]:=(1-w)*(1+w)*det1[k];
 z7b[k]:=(1+w)*(1+w)*det2[k];
 z7c[k]:=(1-w)*(1-w)*det3[k];
 z7d[k]:=(1+w)*(1-w)*det4[k];

 z1[k]:=z1a[k]+z1b[k]+z1c[k]+z1d[k];
 z3[k]:=z3a[k]+z3b[k]+z3c[k]+z3d[k];
 z5[k]:=z5a[k]+z5b[k]+z5c[k]+z5d[k];
 z7[k]:=z7a[k]+z7b[k]+z7c[k]+z7d[k];
end;
for i:=1 to sf do
```

```
begin
ft[d1[i]]:=ft[d1[i]]+z1[i]*tx*t/4;  ft[d2[i]]:=ft[d2[i]]+z1[i]*ty*t/4;
ft[d3[i]]:=ft[d3[i]]+z3[i]*tx*t/4;  ft[d4[i]]:=ft[d4[i]]+z3[i]*ty*t/4;
ft[d5[i]]:=ft[d5[i]]+z5[i]*tx*t/4;  ft[d6[i]]:=ft[d6[i]]+z5[i]*ty*t/4;
ft[d7[i]]:=ft[d7[i]]+z7[i]*tx*t/4;  ft[d8[i]]:=ft[d8[i]]+z7[i]*ty*t/4;
end;
for i:=1 to sbt do    f[i]:=ft[i]+fb[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Goi chuong trinh con de tinh ung suat*);
tinhus;

(*Doc ket qua*);
writeln ('chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('ung suat1');
for i:=1 to sf do
writeln(us1[i]);
writeln ('ung suat2');
for i:=1 to sf do
writeln(us2[i]);
writeln ('ung suat3');
for i:=1 to sf do
writeln(us3[i]);
readln;
end.
```

```
Program CTR14_Tinh_khung_phang_tren_goi_tua_thuong_va_goi_tua_dan_hoi ;
 uses crt;
 type  mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
 mt3=array[1..20] of integer;
 Var i,j, k,sn,st,sbt,tbt,sgd,ss,rr,x,y,w,z:integer;
 a1,b1,p,q1,e,dt,f,fn,mq,qq,fl,l,m,m1,m2,m1q,m2q,m1p,m2p,c1,c2,c3,c4,c5,c6,
 c7,cd,cd3,cd4,el1,el2,g1,g2,g3,g4,ma,la,mb1,mb2,lb1,lb2,l1w,l2w,m1w,m2w,
 lc1,lc2,l1q,l2q,l1p,l2p,u,v,z1,z2,z3,qq1,qq2,qq3,qq4,qq5,qq6,xx1,xx2,yy1,
 yy2,hc:mt2;
 d1,d2,d3,d4,d5,d6,a,b,c,d,x1,x2,x3,x4,x5,x6,y1,y2,y3,y4,y5,y6,tgd:mt3;
 s:mt1; q,r:real;
Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var    i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
    s:=s+1;
    for i:= s+1 to n do
     Begin
      if(a[s,s]<>0) then
      q:=a[s,i]/a[s,s];
      for j:=i to n do
       a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
     End
 UNTIL(s= n -1);
 x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
   Begin
     r :=0;
     for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
     if(a[i,i]<>0) then
     x[i]:= (b[i]-r)/ a[i,i];
   End;
end;

 begin clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
 writeln('tong so BTD');
 readln(tbt);
 writeln('so thanh');
 readln(st);
 writeln('nhap so BTD co chuyen vi');
 readln(sbt);
 writeln('nhap so BTD khong co chuyen vi');
```

```
readln(z);
writeln('nhap so so thu tu BTD khong co chuyen vi');
for i :=1 to z do
readln(d[i]);
writeln('nhap tong so bac tu do');
readln(tbt);
writeln('nhap  toa do x1');
for i :=1 to st do  readln(xx1[i]);
writeln('nhap toa do x2');
for i :=1 to st do  readln(xx2[i]);
 writeln('nhap  toa do y1');
for i :=1 to st do  readln(yy1[i]);
writeln('nhap toa do y2');
for i :=1 to st do  readln(yy2[i]);
writeln('btd d1'); for i :=1 to st do   readln(d1[i]);
writeln('btd d2'); for i :=1 to st do   readln(d2[i]);
writeln('btd d3'); for i :=1 to st do   readln(d3[i]);
writeln('btd d4'); for i :=1 to st do   readln(d4[i]);
writeln('btd d5'); for i :=1 to st do   readln(d5[i]);
writeln('btd d6'); for i :=1 to st do   readln(d6[i]);
writeln('nhap so BTD co goi tua dan hoi');
readln(sgd);
writeln('nhap so thu tu BTD co goi tua dan hoi');
if(sgd<>0) then for i:=1 to sgd do  readln(tgd[i]);
writeln('nhap he so do cung');
if(sgd<>0) then for i:=1 to sgd do  readln(hc[tgd[i]]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap mo men quan tinh');
for i:=1 to st do  readln(mq[i]);
writeln('nhap thanh fan ngoai luc');
for i:=1 to sbt do
readln (fn[i]);
writeln ('nhap so thanh chiu tai trong fan bo deu');
readln (x);
writeln ('nhap so thanh chiu tai trong tap trung');
readln(y);
writeln ('nhap so thanh khong chiu tai trong ');
readln(w);
if(x<>0) then
begin
writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
```

```
 for i:=1 to x do
 readln (a[i]);
 writeln('nhap cuong do tai trong fan bo deu');
 for i:=1 to x do
 readln (q1[i]);
 end;
 if (y<>0)then
 begin
  writeln('nhap so thu tu thanh chiu tai trong tap trung');
  for i:=1 to y do
  readln (b[i]);
  writeln('nhap tai trong tap trung');
  for i:=1 to y do
  readln (p[i]);
  writeln('nhap a1');
  for i:=1 to y do
  readln (a1[i]);
  writeln('nhap b1');
  for i:=1 to y do
  readln (b1[i]);
  end;
  if(w<>0) then
 begin
 writeln('nhap so thu tu thanh khong chiu tai trong ');
 for i:=1 to w do
 readln (c[i]);
 end;

(*Ghep cac MTDC rieng vao MTDC tong the*);
 for i:=1 to st do
 begin
  cd[i]:=sqrt(sqr(xx2[i]-xx1[i])+sqr(yy2[i]-yy1[i]));
  l[i]:=(xx2[i]-xx1[i])/cd[i]; m[i]:=(yy2[i]-yy1[i])/cd[i];
  cd3[i]:= sqr(cd[i])*cd[i];
  if(((cd3[i]<>0) and (cd[i]<>0)) and (sqr(cd[i])<>0)) then
  begin
  g1[i]:=12*e[i]*mq[i]/cd3[i]; g2[i]:=6*e[i]*mq[i]/sqr(cd[i]);
  g3[i]:=dt[i]*e[i]/cd[i]; g4[i]:=e[i]*mq[i]/cd[i];
  end;
  c1[i]:=g3[i]*sqr(l[i])+g1[i]*sqr(m[i]);
  c2[i]:=(g3[i]-g1[i])*l[i]*m[i]; c3[i]:=g3[i]*sqr(m[i])+g1[i]*sqr(l[i]);
  c4[i]:=g2[i]*m[i];  c5[i]:=g2[i]*l[i]; c6[i]:=4*g4[i];  c7[i]:=2*g4[i];
end;
for i:=1 to st do
```

```
begin
 s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
 s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
 s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
 s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c4[i];
 s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c5[i];
 s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c6[i];
 s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c1[i];
 s[d2[i],d4[i]]:=s[d2[i],d4[i]]-c2[i];
 s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c4[i];
 s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c1[i];
 s[d1[i],d5[i]]:=s[d1[i],d5[i]]-c2[i];
 s[d2[i],d5[i]]:=s[d2[i],d5[i]]-c3[i];
 s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c5[i];
 s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c2[i];
 s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c3[i];
 s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c4[i];
 s[d2[i],d6[i]]:=s[d2[i],d6[i]]-c5[i];
 s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c7[i];
 s[d4[i],d6[i]]:=s[d4[i],d6[i]]-c4[i];
 s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c5[i];
 s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c6[i];
end;
for i:=1 to sbt do
for j:=1 to i-1 do  s[i,j]:=s[j,i];
if(sgd<>0) then for i:=1 to sgd do
s[tgd[i],tgd[i]]:=s[tgd[i],tgd[i]]+hc[tgd[i]];

(*Ghep cac vec to tai trong*);
if(x<>0) then
begin
  for i:=1 to x do
  begin
  x1[i]:=d1[a[i]];      x2[i]:=d2[a[i]];     x3[i]:=d3[a[i]];
  x4[i]:=d4[a[i]];      x5[i]:=d5[a[i]];     x6[i]:=d6[a[i]];
  la[i]:=q1[i]*cd[a[i]]/2;   ma[i]:=q1[i]*sqr(cd[a[i]])/12;
  end;
  for i:=1 to x do
  begin
  f[x1[i]]:=f[x1[i]]-(la[i])*m[a[i]];
  f[x2[i]]:=f[x2[i]]+(la[i])*l[a[i]];
  f[x3[i]]:=f[x3[i]]-ma[i];
  f[x4[i]]:=f[x4[i]]-(la[i])*m[a[i]];
  f[x5[i]]:=f[x5[i]]+(la[i])*l[a[i]];
```

```
    f[x6[i]]:=f[x6[i]]+ma[i];
    end;
  end;
  if (y<>0) then
   begin
    for i :=1 to y do
    begin
    cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; y1[i]:=d1[b[i]];    y2[i]:=d2[b[i]];
    y3[i]:=d3[b[i]];              y4[i]:=d4[b[i]];   y5[i]:= d5[b[i]];
    y6[i]:= d6[b[i]];  mb1[i]:=p[i]*a1[i]*sqr(b1[i])/sqr(cd[b[i]]);
    mb2[i]:=p[i]*b1[i]*sqr(a1[i])/sqr(cd[b[i]]);
    if(cd3[i]<>0) then
        begin
         lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i];
         lb2[i]:=p[i]-lb1[i];
        end;
   end;
   for i :=1 to y do
   begin
       if(sqr(cd[b[i]])<>0) then
        begin
        f[y1[i]]:=f[y1[i]]-(lb1[i])*m[b[i]];
        f[y2[i]]:=f[y2[i]]+(lb1[i])*l[b[i]];
        f[y3[i]]:=f[y3[i]]-mb1[i];
        f[y4[i]]:=f[y4[i]]-(lb2[i])*m[b[i]];
        f[y5[i]]:=f[y5[i]]+(lb2[i])*l[b[i]];
        f[y6[i]]:=f[y6[i]]+mb2[i];
        end;
  end;
  end;
  for i:=1 to sbt do   f[i]:=f[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

for i:=1 to st do
 begin
 qq1[i]:=qq[d1[i]];      qq2[i]:=qq[d2[i]];      qq3[i]:=qq[d3[i]];
 qq4[i]:=qq[d4[i]];      qq5[i]:=qq[d5[i]];      qq6[i]:=qq[d6[i]];
 end;

(*Tinh mo men o trang thai tu do*);
for i:=1 to z do     qq[d[i]]:=0;
for i:=1 to st do
```

```
begin
if(cd[i]<>0) then
 begin
 z1[i]:=(6*e[i]*mq[i]/sqr(cd[i]))*((qq1[i]-qq4[i])*m[i]+(qq5[i]-
 qq2[i])*l[i]); z2[i]:=(2*e[i]*mq[i]/cd[i])*(2*qq3[i]+qq6[i]);
 z3[i]:=(2*e[i]*mq[i]/cd[i])*(qq3[i]+2*qq6[i]);
 end;
 m1[i]:=z1[i]+z2[i];
 m2[i]:=z1[i]+z3[i];
 end;
(*Tinh tong momen*);
  if(x<>0) then
   begin
     for i:=1 to x do
     begin
      m1q[i]:=m1[a[i]]+ma[i];
      m2q[i]:=m2[a[i]]-ma[i];
     end;
   end;
  if(y<>0) then
  begin
   for i:=1 to y do
   begin
   m1p[i]:=m1[b[i]]+mb1[i];
   m2p[i]:=m2[b[i]]-mb2[i];
   end;
  end;
  if(w<>0) then
  begin
   for i:=1 to w do
   begin
   m1w[i]:=m1[c[i]];
   m2w[i]:=m2[c[i]];
   end;
  end;

 (*Tinh luc cat*);
 if(x<>0) then
   begin
    for i:=1 to x do
    begin
     la[i]:=q1[i]*(cd[a[i]])/2;
     l1q[i]:=-(m1q[i]+m2q[i])/cd[a[i]]-la[i];
     l2q[i]:=(m1q[i]+m2q[i])/cd[a[i]]-la[i];
    end;
   end;
```

```
 if(y<>0) then
 begin
  for i:=1 to y do
   begin
   cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; if(cd3[i]<>0) then
   lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i];
   lb2[i]:=p[i]-lb1[i];
   l1p[i]:=-(m1p[i]+m2p[i])/cd[b[i]]-lb1[i];
   l2p[i]:=(m1p[i]+m2p[i])/cd[b[i]]-lb2[i];
  end;
 end;
 if(w<>0) then
 begin
  for i:=1 to w do
   begin
   l1w[i]:=-(m1w[i]+m2w[i])/cd[c[i]];
   l2w[i]:=(m1w[i]+m2w[i])/cd[c[i]];
   end;
 end;
(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('gia tri mo men w');
if (w<>0) then
begin
for i:=1 to w do
writeln (m1[c[i]],m2[c[i]]);
end;
writeln ('gia tri mo men x');
if (x<>0) then
begin
for i :=1 to x do
writeln (m1q[i],m2q[i]);
end;
writeln ('gia tri mo men y');
if (y<>0) then
begin
for i :=1 to y do
writeln (m1p[i],m2p[i]);
end;
writeln ('gia tri luc cat w');
if (w<>0) then
```

```
begin
for i :=1 to w do
writeln (l1w[i],l2w[i]);
end;
writeln ('gia tri luc cat x');
if (x<>0) then
begin
for i :=1 to x do
writeln (l1q[i],l2q[i]);
end;
writeln ('gia tri luc cat y');
if (y<>0) then
begin
for i :=1 to y do
writeln (l1p[i],l2p[i]);
end;
readln;
end.
```

```
Program CTR15_Tinh_khung_phang_co_goi_tua_lun_theo_FF_mo_hinh_lo_xo;
 uses crt;
 type  mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
 mt3=array[1..20] of integer;
Var i,j, k,sn,st,sbt,tbt,ss,rr,x,y,w,z,sgc:integer;
 a1,b1,p,q1,e,dt,f,fn,mq,qq,fl,l,m,m1,m2,m1q,m2q,m1p,m2p,c1,c2,c3,c4,c5,c6,
 c7,cd,cd3,cd4,el1,el2,g1,g2,g3,g4,ma,la,mb1,mb2,lb1,lb2,l1w,l2w,m1w,m2w,
 lc1,lc2,l1q,l2q,l1p,l2p,u,v,z1,z2,z3,qq1,qq2,qq3,qq4,qq5,qq6,xx1,xx2,yy1,
 yy2,cv,max:mt2;
 d1,d2,d3,d4,d5,d6,a,b,c,d,x1,x2,x3,x4,x5,x6,y1,y2,y3,y4,y5,y6,tgc:mt3;
 s:mt1; q,r,cc,maxx:real;

procedure gtcdtd(a:mt1;n:integer);
begin
 max[i]:=abs(a[i,1]);
for i:=1 to n do
for j:=2 to n do
begin
if ((abs(a[i,j])>max[i]) or (abs(a[i,j])=max[i]))  then
 max[i]:=abs(a[i,j]) else max[i]:=max[i] ;
end;
 maxx:=max[1];
for i:=2 to n do
begin
 if(max[i]>maxx) then
 maxx:=max[i] else maxx:=maxx ;
end;
end;

Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
       Begin
         if(a[s,s]<>0) then
         q:=a[s,i]/a[s,s];
         for j:=i to n do
          a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
UNTIL(s= n -1);
 x[n]:=b[n]/a[n,n];
```

```
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
 end;
  begin clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
  writeln('nhap tong so BTD');
  readln(tbt);
  writeln('so thanh');
  readln(st);
  writeln('nhap so bac tu do co chuyen vi cho truoc');
  readln(sgc);
  writeln('nhap so thu tu bac tu do co chuyen vi cho truoc');
  if(sgc<>0) then for i:=1 to sgc do  readln(tgc[i]);
  writeln('nhap gia tri chuyen vi cho cho truoc');
  if(sgc<>0) then for i:=1 to sgc do  readln(cv[tgc[i]]);
  writeln('nhap  toa do x1');
  for i :=1 to st do  readln(xx1[i]);
  writeln('nhap toa do x2');
  for i :=1 to st do  readln(xx2[i]);
   writeln('nhap  toa do y1');
  for i :=1 to st do  readln(yy1[i]);
  writeln('nhap toa do y2');
  for i :=1 to st do  readln(yy2[i]);
  writeln('btd d1'); for i :=1 to st do   readln(d1[i]);
  writeln('btd d2'); for i :=1 to st do   readln(d2[i]);
  writeln('btd d3'); for i :=1 to st do   readln(d3[i]);
  writeln('btd d4'); for i :=1 to st do   readln(d4[i]);
  writeln('btd d5'); for i :=1 to st do   readln(d5[i]);
  writeln('btd d6'); for i :=1 to st do   readln(d6[i]);
  writeln('nhap modun dan hoi');
  for i:=1 to st do  readln(e[i]);
  writeln('nhap dien tich');
  for i:=1 to st do  readln(dt[i]);
  writeln('nhap mo men quan tinh');
  for i:=1 to st do  readln(mq[i]);
  writeln('nhap thanh fan ngoai luc');
  for i:=1 to sbt do
  readln (fn[i]);
  writeln ('nhap so thanh chiu tai trong fan bo deu');
```

```
readln (x);
writeln ('nhap so thanh chiu tai trong tap trung');
readln(y);
writeln ('nhap so thanh khong chiu tai trong ');
readln(w);
if(x<>0) then
begin
writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
for i:=1 to x do
readln (a[i]);
writeln('nhap cuong do tai trong fan bo deu');
for i:=1 to x do
readln (q1[i]);
end;
if (y<>0)then
begin
writeln('nhap so thu tu thanh chiu tai trong tap trung');
for i:=1 to y do
readln (b[i]);
writeln('nhap tai trong tap trung');
for i:=1 to y do
readln (p[i]);
writeln('nhap a1');
for i:=1 to y do
readln (a1[i]);
writeln('nhap b1');
for i:=1 to y do
readln (b1[i]);
end;
if(w<>0) then
begin
writeln('nhap so thu tu thanh khong chiu tai trong ');
for i:=1 to w do
readln (c[i]);
end;

(*Ghep cac MTDC rieng vao MTDC tong the *);
for i:=1 to st do
begin
cd[i]:=sqrt(sqr(xx2[i]-xx1[i])+sqr(yy2[i]-yy1[i]));
l[i]:=(xx2[i]-xx1[i])/cd[i]; m[i]:=(yy2[i]-yy1[i])/cd[i];
cd3[i]:= sqr(cd[i])*cd[i];
if(((cd3[i]<>0) and (cd[i]<>0)) and (sqr(cd[i])<>0)) then
begin
g1[i]:=12*e[i]*mq[i]/cd3[i]; g2[i]:=6*e[i]*mq[i]/sqr(cd[i]);
```

```
 g3[i]:=dt[i]*e[i]/cd[i]; g4[i]:=e[i]*mq[i]/cd[i];
 end;
 c1[i]:=g3[i]*sqr(l[i])+g1[i]*sqr(m[i]);
 c2[i]:=(g3[i]-g1[i])*l[i]*m[i]; c3[i]:=g3[i]*sqr(m[i])+g1[i]*sqr(l[i]);
 c4[i]:=g2[i]*m[i];  c5[i]:=g2[i]*l[i]; c6[i]:=4*g4[i];  c7[i]:=2*g4[i];
end;
for i:=1 to st do
begin
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c4[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c5[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c6[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c1[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]-c2[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c4[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c1[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]-c2[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]-c3[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c5[i];
  s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c2[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c3[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c4[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]-c5[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c7[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]-c4[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c5[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c6[i];
 end;
 for i:=1 to tbt do
 for j:=1 to i-1 do   s[i,j]:=s[j,i];

(*Goi chuong trinh con de tinh gia tri tuyet doi max cua cac fan tu MT*);
GTCDTD(s,tbt);
 cc:=(maxx)*(10E+08);
 if(sgc<>0) then for i:=1 to sgc do
 s[tgc[i],tgc[i]]:=s[tgc[i],tgc[i]]+cc;

 (*Ghep cac vec to tai trong*);
 if(x<>0) then
 begin
   for i:=1 to x do
   begin
   x1[i]:=d1[a[i]];       x2[i]:=d2[a[i]];      x3[i]:=d3[a[i]];
```

```
    x4[i]:=d4[a[i]];      x5[i]:=d5[a[i]];      x6[i]:=d6[a[i]];
    la[i]:=q1[i]*cd[a[i]]/2;   ma[i]:=q1[i]*sqr(cd[a[i]])/12;
    end;
    for i:=1 to x do
    begin
    f[x1[i]]:=f[x1[i]]-(la[i])*m[a[i]];
    f[x2[i]]:=f[x2[i]]+(la[i])*l[a[i]];
    f[x3[i]]:=f[x3[i]]-ma[i];
    f[x4[i]]:=f[x4[i]]-(la[i])*m[a[i]];
    f[x5[i]]:=f[x5[i]]+(la[i])*l[a[i]];
    f[x6[i]]:=f[x6[i]]+ma[i];
    end;
  end;
  if (y<>0) then
   begin
    for i :=1 to y do
    begin
    cd3[i]:=sqr(cd[b[i]])*cd[b[i]];  y1[i]:=d1[b[i]];    y2[i]:=d2[b[i]];
    y3[i]:=d3[b[i]];                 y4[i]:=d4[b[i]];    y5[i]:= d5[b[i]];
    y6[i]:= d6[b[i]];   mb1[i]:=p[i]*a1[i]*sqr(b1[i])/sqr(cd[b[i]]);
    mb2[i]:=p[i]*b1[i]*sqr(a1[i])/sqr(cd[b[i]]);
    if(cd3[i]<>0) then
        begin
         lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i];
         lb2[i]:=p[i]-lb1[i];
        end;
   end;
   for i :=1 to y do
   begin
       if(sqr(cd[b[i]])<>0) then
        begin
        f[y1[i]]:=f[y1[i]]-(lb1[i])*m[b[i]];
        f[y2[i]]:=f[y2[i]]+(lb1[i])*l[b[i]];
        f[y3[i]]:=f[y3[i]]-mb1[i];
        f[y4[i]]:=f[y4[i]]-(lb2[i])*m[b[i]];
        f[y5[i]]:=f[y5[i]]+(lb2[i])*l[b[i]];
        f[y6[i]]:=f[y6[i]]+mb2[i];
        end;
  end;
  end;
  if(sgc<>0) then for i:=1 to sgc do
  f[tgc[i]]:=f[tgc[i]]+cc*cv[tgc[i]];
  for i:=1 to tbt do    f[i]:=f[i]+fn[i];
```

```
(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,tbt);

for i:=1 to st do
 begin
 qq1[i]:=qq[d1[i]];      qq2[i]:=qq[d2[i]];      qq3[i]:=qq[d3[i]];
 qq4[i]:=qq[d4[i]];      qq5[i]:=qq[d5[i]];      qq6[i]:=qq[d6[i]];
 end;

(*Tinh mo men o trang thai tu do*);
for i:=1 to z do      qq[d[i]]:=0;
for i:=1 to st do
begin
if(cd[i]<>0) then
 begin
 z1[i]:=(6*e[i]*mq[i]/sqr(cd[i]))*((qq1[i]-qq4[i])*m[i]+(qq5[i]-
 qq2[i])*l[i]); z2[i]:=(2*e[i]*mq[i]/cd[i])*(2*qq3[i]+qq6[i]);
 z3[i]:=(2*e[i]*mq[i]/cd[i])*(qq3[i]+2*qq6[i]);
 end;
 m1[i]:=z1[i]+z2[i];
 m2[i]:=z1[i]+z3[i];
end;
(*Tinh tong momen*);
  if(x<>0) then
   begin
     for i:=1 to x do
     begin
      m1q[i]:=m1[a[i]]+ma[i];
      m2q[i]:=m2[a[i]]-ma[i];
     end;
   end;
   if(y<>0) then
   begin
    for i:=1 to y do
    begin
    m1p[i]:=m1[b[i]]+mb1[i];
    m2p[i]:=m2[b[i]]-mb2[i];
    end;
   end;
   if(w<>0) then
   begin
    for i:=1 to w do
    begin
    m1w[i]:=m1[c[i]];
```

```
      m2w[i]:=m2[c[i]];
      end;
     end;

   (*Tinh luc cat*);
   if(x<>0) then
    begin
     for i:=1 to x do
     begin
      la[i]:=q1[i]*(cd[a[i]])/2;
      l1q[i]:=-(m1q[i]+m2q[i])/cd[a[i]]-la[i];
      l2q[i]:=(m1q[i]+m2q[i])/cd[a[i]]-la[i];
     end;
    end;
   if(y<>0) then
   begin
    for i:=1 to y do
     begin
     cd3[i]:=sqr(cd[b[i]])*cd[b[i]]; if(cd3[i]<>0) then
     lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+2*a1[i])/cd3[i];
     lb2[i]:=p[i]-lb1[i];
     l1p[i]:=-(m1p[i]+m2p[i])/cd[b[i]]-lb1[i];
     l2p[i]:=(m1p[i]+m2p[i])/cd[b[i]]-lb2[i];
    end;
   end;
   if(w<>0) then
   begin
    for i:=1 to w do
     begin
     l1w[i]:=-(m1w[i]+m2w[i])/cd[c[i]];
     l2w[i]:=(m1w[i]+m2w[i])/cd[c[i]];
     end;
   end;

(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('gia tri mo men w');
if (w<>0) then
begin
for i:=1 to w do
writeln (m1[c[i]],m2[c[i]]);
end;
```

```
writeln ('gia tri mo men x');
if (x<>0) then
begin
for i :=1 to x do
writeln (m1q[i],m2q[i]);
end;
writeln ('gia tri mo men y');
if (y<>0) then
begin
for i :=1 to y do
writeln (m1p[i],m2p[i]);
end;
writeln ('gia tri luc cat w');
if (w<>0) then
begin
for i :=1 to w do
writeln (l1w[i],l2w[i]);
end;
writeln ('gia tri luc cat x');
if (x<>0) then
begin
for i :=1 to x do
writeln (l1q[i],l2q[i]);
end;
writeln ('gia tri luc cat y');
if (y<>0) then
begin
for i :=1 to y do
writeln (l1p[i],l2p[i]);
end;
readln;
end.
```

```
Program CTR16_Tinh_he_dam_truc_giao;
 uses crt;
 type  mt1=array[1..20,1..20] of real; mt2=array[1..20] of real;
 mt3=array[1..10] of integer;
 Var i,j, k,sn,sbn,st,sbt,tbt,ss,rr,x,y,z,w,sgd:integer;

a1,b1,p,q1,e,dt,f,fc,mq,qq,l,m,m1q,m2q,m1p,m2p,m1z,m2z,c1,c2,c3,c4,c5,c6,c7,c8,c9,el1
,el2,g1,g2,g3,g4:mt2;
 cd,cd3,mt,mqx,e1,m1,m2,t1,t2,la,ma,lb1,lb2,mb1,mb2,z1,z2,xx1,xx2,yy1,yy2,
 hc,mqy,r1,r2,r3,r4:mt2;
 d1,d2,d3,d4,d5,d6,a,b,c,d,x1,x2,x3,x4,x5,x6,y1,y2,y3,y4,y5,y6,tgd:mt3;
 s:mt1;   q,r:real;
Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
       if(a[s,s]<>0) then
       q:=a[s,i]/a[s,s];
       for j:=i to n do
        a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
      End
 UNTIL(s= n -1);
 x[n]:=b[n]/a[n,n];
 for i:= n -1  downto 1 do
    Begin
       r :=0;
       for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
       if(a[i,i]<>0) then
       x[i]:= (b[i]-r)/ a[i,i];
    End;
end;

 begin  clrscr;
 (*Nguoi lap trinh:Vo nhu Cau*);
 writeln('nhap tong so BTD');
 readln(tbt);
 writeln('nhap so thanh');
 readln(st);
 writeln('nhap so bac tu do co chuyen vi');
 readln(sbt);
```

```
writeln('nhap tong so bac tu do');
readln(tbt);
writeln('nhap so bac tu do khong co chuyen vi');
readln(w);
if (w<>0) then
begin
writeln('nhap so thu tu bac tu do khong co chuyen vi');
for i:=1 to w do
readln(d[i]);
end;
writeln('nhap so bac tu do co goi tua dan hoi');
readln(sgd);
writeln('nhap so thu tu bac tu do co goi tua dan hoi');
if(sgd<>0) then for i:=1 to sgd do readln(tgd[i]);
writeln('nhap he so do cung');
if(sgd<>0) then for i:=1 to sgd do readln(hc[tgd[i]]);
writeln ('nhap so thu tu bac tu do');
writeln('nhap d1'); for i :=1 to st do   readln(d1[i]);
writeln('nhap d2'); for i :=1 to st do   readln(d2[i]);
writeln('nhap d3'); for i :=1 to st do   readln(d3[i]);
writeln('nhap d4'); for i :=1 to st do   readln(d4[i]);
writeln('nhap d5'); for i :=1 to st do   readln(d5[i]);
writeln('nhap d6'); for i :=1 to st do   readln(d6[i]);
writeln('nhap toa do x1');
for i:=1 to st do  readln(xx1[i]);
writeln('nhap toa do x2');
for i:=1 to st do  readln(xx2[i]);
writeln('nhap toa do y1');
for i:=1 to st do  readln(yy1[i]);
writeln('nhap toa do y2');
for i:=1 to st do  readln(yy2[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap mo men quan tinh y');
for i:=1 to st do  readln(mqy[i]);
writeln('nhap mo men quan tinh x');
for i:=1 to st do  readln(mqx[i]);
 writeln('nhap mo dun truot');
for i:=1 to st do  readln(mt[i]);
writeln ('nhap so thanh chiu tai trong fan bo deu');
readln (x);
writeln ('nhap so thanh chiu tai trong tap trung');
```

```
 readln(y);
 writeln ('nhap so thanh khong chiu tai trong ');
 readln(z);
 if(x<>0) then
 begin
 writeln('nhap so thu tu thanh chiu tai trong fan bo deu');
 for i:=1 to x do
 readln (a[i]);
 writeln('nhap cuong do tai trong fan bo deu');
 for i:=1 to x do
 readln (q1[i]);
 end;
 if (y<>0)then
 begin
  writeln('nhap so thu tu thanh chiu tai trong tap trung');
  for i:=1 to y do
  readln (b[i]);
  writeln('nhap tai trong tap trung');
  for i:=1 to y do
  readln (p[i]);
  writeln('nhap a1');
  for i:=1 to y do
  readln (a1[i]);
  writeln('nhap b1');
  for i:=1 to y do
  readln (b1[i]);
  end;
   if(z<>0) then
 begin
 writeln('nhap so thu tu thanh khong chiu tai trong ');
 for i:=1 to z do
 readln (c[i]);
 end;

(*Ghep cac MTDC rieng vao MTDC tong the*);
 for i:=1 to st do
 begin
 cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(y2[i]-y1[i]));
 l[i]:=(x2[i]-x1[i])/cd[i];
 m[i]:=(y2[i]-y1[i])/cd[i];
  cd3[i]:= sqr(cd[i])*cd[i];
  if(((cd3[i]<>0) and (cd[i]<>0)) and (sqr(cd[i])<>0)) then
  begin
  g1[i]:=e[i]*mq[i]/cd[i]; g2[i]:=e[i]*mq[i]/sqr(cd[i]);
```

```
 g3[i]:=e[i]*mq[i]/cd3[i]; g4[i]:=mt[i]*mqx[i]/cd[i];
 end;
c1[i]:=12*g3[i];  c2[i]:=6*g2[i]*m[i]; c3[i]:=6*g2[i]*l[i];
c4[i]:=4*g1[i]*sqr(m[i])+g4[i]*sqr(l[i]); c5[i]:=(4*g1[i]-g4[i])*l[i]*m[i];
c6[i]:=2*g1[i]*sqr(m[i])+g4[i]*sqr(l[i]);  c7[i]:=(2*g1[i]+g4[i])*l[i]*m[i];
c8[i]:=4*g1[i]*sqr(l[i])+g4[i]*sqr(m[i]); c9[i]:=2*g1[i]*sqr(l[i])-
g4[i]*sqr(m[i]);
end;
for i:=1 to st do
begin
 s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
 s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
 s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c4[i];
 s[d1[i],d3[i]]:=s[d1[i],d3[i]]-c3[i];
 s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c5[i];
 s[d3[i],d3[i]]:= s[d3[i],d3[i]]+c8[i];
 s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c1[i];
 s[d2[i],d4[i]]:=s[d2[i],d4[i]]-c2[i];
 s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c3[i];
 s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c1[i];
 s[d1[i],d5[i]]:=s[d1[i],d5[i]]+c2[i];
 s[d2[i],d5[i]]:=s[d2[i],d5[i]]+c6[i];
 s[d3[i],d5[i]]:=s[d3[i],d5[i]]-c7[i];
 s[d4[i],d5[i]]:=s[d4[i],d5[i]]-c2[i];
 s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c4[i];
 s[d1[i],d6[i]]:=s[d1[i],d6[i]]-c3[i];
 s[d2[i],d6[i]]:=s[d2[i],d6[i]]-c7[i];
 s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c9[i];
 s[d4[i],d6[i]]:=s[d4[i],d6[i]]+c3[i];
 s[d5[i],d6[i]]:=s[d5[i],d6[i]]-c5[i];
 s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c8[i];
end;
for i:=1 to sbt do
for j:=1 to i-1 do    s[i,j]:=s[j,i];

(*Ghep cac vecto tai trong*);
 if(x<>0) then
 begin
  for i:=1 to x do
  begin
  x1[i]:=d1[a[i]];       x2[i]:=d2[a[i]];   x3[i]:=d3[a[i]];
  x4[i]:=d4[a[i]];       x5[i]:=d5[a[i]];   x6[i]:=d6[a[i]];
  la[i]:=q1[i]*cd[a[i]]/2;  ma[i]:=q1[i]*sqr(cd[a[i]])/12;
  r1[i]:=(ma[i])*m[a[i]]; r2[i]:=(ma[i])*l[a[i]];
  end;
```

```
      for i:=1 to x do
        begin
          f[x1[i]]:=f[x1[i]]+la[i];
          f[x2[i]]:=f[x2[i]]-r1[i];
          f[x3[i]]:=f[x3[i]]-r2[i];
          f[x4[i]]:=f[x4[i]]+la[i];
          f[x5[i]]:=f[x5[i]]+r1[i];
          f[x6[i]]:=f[x6[i]]+r2[i];
        end;
    end;
    if (y<>0) then
    begin
     for i :=1 to y do
      begin
     y1[i]:=d1[b[i]];    y2[i]:=d2[b[i]];      y3[i]:=d3[b[i]];
     y4[i]:=d4[b[i]];    y5[i]:=d5[b[i]];      y6[i]:=d6[b[i]];
     cd3[i]:=sqr(cd[b[i]])*cd[b[i]];
     mb1[i]:=p[i]*a1[i]*sqr(b1[i])/sqr(cd[b[i]]);
     mb2[i]:= p[i]*b1[i]*sqr(a1[i])/sqr(cd[b[i]]);
     if(cd3[i]<>0) then lb1[i]:=p[i]*sqr(b1[i])*(cd[b[i]]+
     2*a1[i])/cd3[i]; lb2[i]:=p[i]-lb1[i];  r3[i]:=(mb1[i])*m[b[i]];
     r4[i]:=(mb1[i])*l[b[i]];
     end;
     for i :=1 to y do
     begin
     if(sqr(cd[b[i]])<>0) then
     begin
     f[y1[i]]:=f[y1[i]]+lb1[i];
     f[y2[i]]:=f[y2[i]]-r3[i];
     f[y3[i]]:=f[y3[i]]-r4[i];
     f[y4[i]]:=f[y4[i]]+lb2[i];
     f[y5[i]]:=f[y5[i]]+r3[i];
     f[y6[i]]:=f[y6[i]]+r4[i];
    end;
    end;
  end;

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Tinh mo men uon*);
for i:=1 to st do
begin
 e1[i]:=6*(qq[d4[i]]-qq[d1[i]])/cd[i];
```

```
z1[i]:=(e[i]*mq[i]/cd[i])*((4*qq[d3[i]]+2*qq[d6[i]])*l[i]-(4*qq[d2[i]]+
2*qq[d5[i]])*m[i]);
z2[i]:= (e[i]*mq[i]/cd[i])*((2*qq[d3[i]]+4*qq[d6[i]])*l[i]-(2*qq[d2[i]]
+4*qq[d5[i]])*m[i]);
end;
for i:=1 to st do
begin
 m1[i]:=z1[i]-e1[i];
 m2[i]:=z2[i]-e1[i];
end;

(*Tinh tong momen*);
 if(x<>0) then
   begin
     for i:=1 to x do
     begin
     m1q[i]:=m1[a[i]]+ma[i];
     m2q[i]:=m2[a[i]]-ma[i];
     end;
   end;
   if(y<>0) then
   begin
    for i:=1 to y do
    begin
    m1p[i]:=m1[b[i]]+mb1[i];
    m2p[i]:=m2[b[i]]-mb2[i];
    end;
   end;
    if(z<>0) then
   begin
    for i:=1 to z do
    begin
    m1z[i]:=m1[c[i]];
    m2z[i]:=m2[c[i]];
    end;
    end;

   (*tinh momen xoan*);
   for i:=1 to st do
   begin
    t1[i]:=(mt[i]*mqx[i]/cd[i])*((qq[d5[i]]-qq[d2[i]])*l[i]+(qq[d6[i]]
   -qq[d3[i]])*m[i]);     t2[i]:=-t1[i];
   end;
```

```
(*Doc ket qua*);
writeln('gia tri chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('gia tri mo men mz');
if (z<>0) then
begin
for i:=1 to z do
writeln (m1[c[i]],m2[c[i]]);
end;
writeln ('gia tri mo men mq');
if (x<>0) then
begin
for i :=1 to x do
writeln (m1q[i],m2q[i]);
end;
writeln ('gia tri mo men mp');
if (y<>0) then
begin
for i :=1 to y do
writeln (m1p[i],m2p[i]);
end;
writeln ('gia tri mo men tx');
for i :=1 to st do
writeln (t1[i],t2[i]);
readln;
end.
```

```
Program CTR17_Giai_bai_toan_3_chieu_kieu_FTHH_4_mat_4_nut;
Uses crt;
 Type   mt1=array [1..20,1..20] of real;
      mt2=array [1..20] of real;
 Var   d1,d2,d3,d4,d5,d6,d7,d8,d9,d10,d11,d12,v:array[1..20] of integer;
      f,fl,fb,ft,fn,x1,x2,x3,x4,y1,y2,y3,y4,z1,z2,z3,z4,qq,dt,det,c1,c2,c3,
      c4,c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15,c16,c17,c18,c19,c20,c21,
      c22,c23,c24,c25,c26,c27,c28,c29,c30,c31,c32,c33,c34,c35,c36,c37,c38,
      c39,c40,c41,c42,c43,c44,c45,c46,c47,c48,c49,c50,c51,c52,c53,c54,c55,
      c56,c57,c58,c59,c60,c61,c62,c63,c64,c65,c66,c67,c68,c69,c70,c71,c72,
      c73,c74,c75,c76,c77,c78,x14,x34,x24,y24,y34,y14,z34,z24,z14,
      a11,a12,a13,a21,a22,a23,a31,a32,a33,an1,an2,an3,us1,us2,us3,us4,us5,
      us6,m1,m2,m3,m4,m5,m6,m7,m8,m9,m10,m11,m12,h1,h2,h3,h4,h5,h6,h7,
      h8,h9,h10,h11,h12,b1,b2,b3,b4,b5,b6,b7,b8,b9,b10,b11,b12,bb1,bb2,bb3,
      bb4,bb5,bb6,bb7,bb8,bb9,bb10,bb11,bb12,n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,
      n11,n12,s1,s2,s3,s4,s5,s6,s7,s8,s9,s10,s11,s12:mt2;
      p,i,j,k,ss,sf,sbt,tbt,u:integer;  q,hp,tx,ty,e,e1,e2,e3,e4,r:real;
      s,sc,b,d,g,h,l,bcv:mt1;

 Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
 var     i,j,k,s:integer; q,r:real ;
 begin
  s:=0;
  REPEAT
     s:=s+1;
     for i:= s+1 to n do
       Begin
         if(a[s,s]<>0) then
         q:=a[s,i]/a[s,s];
         for j:=i to n do
          a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
  UNTIL(s= n -1);
   x[n]:=b[n]/a[n,n];
   for i:= n -1  downto 1 do
      Begin
         r :=0;
         for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
         if(a[i,i]<>0) then
         x[i]:= (b[i]-r)/ a[i,i];
      End;
  end;
  procedure nhapdulieu;
```

```
begin
 clrscr;
(*Nguoi lap trinh:Vo nhu Cau*);
 writeln('nhap tong so BTD');
 readln(tbt);
 writeln('so fan tu');
 readln(sf);
 writeln('nhap so BTD co chuyen vi');
 readln(sbt);
 writeln('nhap tong so so BTD ');
 readln(tbt);
 writeln('nhap cac  BTD co chuyen vi triet tieu ');
 readln(u);
 writeln('nhap so thu tu BTD co chuyen vi triet tieu ');
 if (U<>0) then for i:=1 to u do readln(v[u]);
 writeln('btd d1'); for i :=1 to sf do  readln(d1[i]);
 writeln('btd d2'); for i :=1 to sf do  readln(d2[i]);
 writeln('btd d3'); for i :=1 to sf do  readln(d3[i]);
 writeln('btd d4'); for i :=1 to sf do  readln(d4[i]);
 writeln('btd d5'); for i :=1 to sf do  readln(d5[i]);
 writeln('btd d6'); for i :=1 to sf do  readln(d6[i]);
 writeln('btd d7'); for i :=1 to sf do  readln(d7[i]);
 writeln('btd d8'); for i :=1 to sf do  readln(d8[i]);
 writeln('btd d9'); for i :=1 to sf do  readln(d9[i]);
 writeln('btd d10'); for i :=1 to sf do  readln(d10[i]);
 writeln('btd d11'); for i :=1 to sf do  readln(d11[i]);
 writeln('btd d12'); for i :=1 to sf do  readln(d12[i]);
 writeln('toa do x1'); for i :=1 to sf do  readln(x1[i]);
 writeln('toa do x2'); for i :=1 to sf do  readln(x2[i]);
 writeln('toa do x3'); for i :=1 to sf do  readln(x3[i]);
 writeln('toa do x4'); for i :=1 to sf do  readln(x4[i]);
 writeln('toa do y1'); for i :=1 to sf do  readln(y1[i]);
 writeln('toa do y2'); for i :=1 to sf do  readln(y2[i]);
 writeln('toa do y3'); for i :=1 to sf do  readln(y3[i]);
 writeln('toa do y4'); for i :=1 to sf do  readln(y4[i]);
 writeln('toa do z1'); for i :=1 to sf do  readln(z1[i]);
 writeln('toa do z2'); for i :=1 to sf do  readln(z2[i]);
 writeln('toa do z3'); for i :=1 to sf do  readln(z3[i]);
 writeln('toa do z4'); for i :=1 to sf do  readln(z4[i]);
 writeln('nhap modun dan hoi');
 readln(e);
 writeln('nhap he so Poatxong');
 readln(hp);
 writeln('nhap ti trong tren fuong x');
```

```
readln(tx);
writeln('nhap ti trong tren fuong y');
readln(ty);
writeln('nhap luc bien');
for i:=1 to sbt do  readln(fb[i]);
writeln('nhap thanh fan ngoai luc');
for i:=1 to sbt do  readln(fn[i]);
end;

procedure part1;
begin
 for i:=1 to sf do
 begin
    x14[i]:=x1[i]-x4[i];  x34[i]:=x3[i]-x4[i]; x24[i]:=x2[i]-x4[i];
    y24[i]:=y2[i]-y4[i];  y34[i]:=y3[i]-y4[i]; y14[i]:=y1[i]-y4[i];
    z34[i]:=z3[i]-z4[i];  z24[i]:=z2[i]-z4[i]; z14[i]:=z1[i]-z4[i];
    det[i]:=x14[i]*(y24[i]*z34[i]-y34[i]*z24[i])+ y14[i]*(z24[i]*x34[i]-
    z34[i]*x24[i])+z14[i]*(x24[i]*y34[i]-x34[i]*y24[i]);
    a11[i]:=(y24[i]*z34[i]-y34[i]*z24[i])/det[i];
    a12[i]:=(y34[i]*z14[i]-y14[i]*z34[i])/det[i];
    a13[i]:=(y14[i]*z24[i]-y24[i]*z14[i])/det[i];
    a21[i]:=(z24[i]*x34[i]-z34[i]*x24[i])/det[i];
    a22[i]:=(z34[i]*x14[i]-z14[i]*x34[i])/det[i];
    a23[i]:=(z14[i]*x24[i]-z24[i]*x14[i])/det[i];
    a31[i]:=(x24[i]*y34[i]-x34[i]*z24[i])/det[i];
    a32[i]:=(x34[i]*y14[i]-x14[i]*y34[i])/det[i];
    a33[i]:=(x14[i]*y24[i]-x24[i]*y14[i])/det[i];
    an1[i]:=a11[i]+a12[i]+a13[i];
    an2[i]:=a21[i]+a22[i]+a23[i];
    an3[i]:=a31[i]+a32[i]+a33[i];
    e1:=e/(1+hp)*(1-2*hp);
    e2:=e1*(1-hp);  e3:=e1*hp;  e4:=e1*(0.5-hp);
  end;
  for i:=1 to 6 do
  for j:=1 to 6 do
  begin
     d[1,1]:=e2; d[1,2]:=e3; d[1,3]:=e3; d[1,4]:=0; d[1,5]:=0; d[1,6]:=0;
     d[2,2]:=e2; d[2,3]:=e3; d[2,4]:=0;  d[2,5]:=0; d[2,6]:=0;
     d[3,3]:=e2;  d[3,4]:=0; d[3,5]:=0; d[3,6]:=0;
     d[4,4]:=e4; d[4,5]:=0; d[4,6]:=0; d[5,5]:=e4; d[5,6]:=0;  d[6,6]:=e4;
  end;
  for i:=1 to 6 do
  for j:=1 to i-1 do   d[i,j]:=d[j,i];
  for k:=1 to sf do
```

```
 begin
  for i:=1 to 6 do
  for j:=1 to 12 do
  begin
     b[1,1]:=a11[k]; b[1,2]:=0; b[1,3]:=0; b[1,4]:=a12[k]; b[1,5]:=0;
     b[1,6]:=0; b[1,7]:=a13[k]; b[1,8]:=0; b[1,9]:=0; b[1,10]:=-an1[k];
     b[1,11]:=0; b[1,12]:=0;
     b[2,1]:=0; b[2,2]:=a21[k]; b[2,3]:=0; b[2,4]:=0; b[2,5]:=a22[k];
     b[2,6]:=0;
     b[2,7]:=0; b[2,8]:=a23[k]; b[2,9]:=0; b[2,10]:=0; b[2,11]:=-an2[k];
     b[2,12]:=0;
     b[3,1]:=0; b[3,2]:=0; b[3,3]:=a31[k]; b[3,4]:=0; b[3,5]:=0;
     b[3,6]:=a32[k]; b[3,7]:=0;b[3,8]:=0; b[3,9]:=a33[k]; b[3,10]:=0;
     b[3,11]:=0; b[3,12]:=-an3[k];
     b[4,1]:=0;    b[4,2]:=a31[k];    b[4,3]:=a21[k];    b[4,4]:=0;    b[4,5]:=a32[k];
b[4,6]:=a22[k];
     b[4,6]:=0; b[4,7]:=0; b[4,8]:=a33[k]; b[4,9]:=a23[k]; b[4,10]:=0;
     b[4,11]:=-an3[k]; b[4,12]:=-an2[k];
     b[5,1]:=a31[k];b[5,2]:=0; b[5,3]:=a11[k];b[5,4]:=a32[k]; b[5,5]:=0;
     b[5,6]:=a12[k];b[5,7]:=a33[k]; b[5,8]:=0; b[5,9]:=a13[k];
     b[5,10]:=-an3[k]; b[5,11]:=0; b[5,12]:=-an1[k];
     b[6,1]:=a21[k]; b[6,2]:=a11[k]; b[6,3]:=0; b[6,4]:=a22[k];
     b[6,5]:=a12[k]; b[6,6]:=0; b[6,7]:=a23[k]; b[6,8]:=a13[k];
     b[6,9]:=0; b[6,10]:=-an2[k]; b[6,11]:=-an1[k]; b[6,12]:=0;
 end;
 for i:=1 to 12 do
 for j:=1 to 6 do  bcv[i,j]:=b[j,i];
 for i:=1 to 12 do
 for j:=1 to 6 do
 begin
    g[i,j]:=0;
    for p:=1 to 6 do g[i,j]:=g[i,j]+bcv[i,p]*d[p,j];
 end;
for i:=1 to 12 do
for j:=1 to 12 do
begin
   h[i,j]:=0;
   for p:=1 to 6 do h[i,j]:=h[i,j]+g[i,p]*b[p,j];
end;
c1[k]:=h[1,1]; c2[k]:=h[1,2]; c3[k]:=h[1,3]; c4[k]:=h[1,4]; c5[k]:=h[1,5];
c6[k]:=h[1,6]; c7[k]:=h[1,7]; c8[k]:=h[1,8]; c9[k]:=h[1,9]; c10[k]:=h[1,10];
c11[k]:=h[1,11];c12[k]:=h[1,12]; c13[k]:=h[2,2]; c14[k]:=h[2,3];
c15[k]:=h[2,4]; c16[k]:=h[2,5]; c17[k]:=h[2,6]; c18[k]:=h[2,7];
c19[k]:=h[2,8]; c20[k]:=h[2,9]; c21[k]:=h[2,10]; c22[k]:=h[2,11];
```

```
 c23[k]:=h[2,12]; c24[k]:=h[3,3];  c25[k]:=h[3,4];  c26[k]:=h[3,5];
 c27[k]:=h[3,6];  c28[k]:=h[3,7];  c29[k]:=h[3,8];  c30[k]:=h[3,9];
 c31[k]:=h[3,10];  c32[k]:=h[3,11]; c33[k]:=h[3,12]; c34[k]:=h[4,4];
 c35[k]:=h[4,5];   c36[k]:=h[4,6]; c37[k]:=h[4,7];  c38[k]:=h[4,8];
 c39[k]:=h[4,9];  c40[k]:=h[4,10];  c41[k]:=h[4,11];  c42[k]:=h[4,12];
 c43[k]:=h[5,5];   c44[k]:=h[5,6];  c45[k]:=h[5,7];  c46[k]:=h[5,8];
 c47[k]:=h[5,9];  c48[k]:=h[5,10];   c49[k]:=h[5,11];  c50[k]:=h[5,12];
 c51[k]:=h[6,6];  c52[k]:=h[6,7];   c53[k]:=h[6,8];   c54[k]:=h[6,9];
 c55[k]:=h[6,10];  c56[k]:=h[6,11]; c57[k]:=h[6,12];  c58[k]:=h[7,7];
 c59[k]:=h[7,8];  c60[k]:=h[7,9];   c61[k]:=h[7,10];  c62[k]:=h[7,11];
 c63[k]:=h[7,12]; c64[k]:=h[8,8];   c65[k]:=h[8,9];   c66[k]:=h[8,10];
 c67[k]:=h[8,11];  c68[k]:=h[8,12]; c69[k]:=h[9,9];   c70[k]:=h[9,10];
 c71[k]:=h[9,11]; c72[k]:=h[9,12]; c73[k]:=h[10,10]; c74[k]:=h[10,11];
 c75[k]:=h[10,12]; c76[k]:=h[11,11]; c77[k]:=h[11,12]; c78[k]:=h[12,12];
end;
end;
begin
 nhapdulieu;
 part1;
(*Ghep cac MTDC rieng vao MTDC tong the*);
 for i:=1 to sf do
 begin
   s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
   s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
   s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c3[i];
   s[d1[i],d4[i]]:=s[d1[i],d4[i]]+c4[i];
   s[d1[i],d5[i]]:=s[d1[i],d5[i]]+c5[i];
   s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c6[i];
   s[d1[i],d7[i]]:=s[d1[i],d7[i]]+c7[i];
   s[d1[i],d8[i]]:=s[d1[i],d8[i]]+c8[i];
   s[d1[i],d9[i]]:=s[d1[i],d9[i]]+c9[i];
   s[d1[i],d10[i]]:=s[d1[i],d10[i]]+c10[i];
   s[d1[i],d11[i]]:=s[d1[i],d11[i]]+c11[i];
   s[d1[i],d12[i]]:=s[d1[i],d12[i]]+c12[i];
   s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c13[i];
   s[d2[i],d3[i]]:=s[d2[i],d3[i]]+c14[i];
   s[d2[i],d4[i]]:=s[d2[i],d4[i]]+c15[i];
   s[d2[i],d5[i]]:=s[d2[i],d5[i]]+c16[i];
   s[d2[i],d6[i]]:=s[d2[i],d6[i]]+c17[i];
   s[d2[i],d7[i]]:=s[d2[i],d7[i]]+c18[i];
   s[d2[i],d8[i]]:=s[d2[i],d8[i]]+c19[i];
   s[d2[i],d9[i]]:=s[d2[i],d9[i]]+c20[i];
   s[d2[i],d10[i]]:=s[d2[i],d10[i]]+c21[i];
   s[d2[i],d11[i]]:=s[d2[i],d11[i]]+c22[i];
```

```
s[d2[i],d12[i]]:=s[d2[i],d12[i]]+c23[i];
s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c24[i];
s[d3[i],d4[i]]:=s[d3[i],d4[i]]+c25[i];
s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c26[i];
s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c27[i];
s[d3[i],d7[i]]:=s[d3[i],d7[i]]+c28[i];
s[d3[i],d8[i]]:=s[d3[i],d8[i]]+c29[i];
s[d3[i],d9[i]]:=s[d3[i],d9[i]]+c30[i];
s[d3[i],d10[i]]:=s[d3[i],d10[i]]+c31[i];
s[d3[i],d11[i]]:=s[d3[i],d11[i]]+c32[i];
s[d3[i],d12[i]]:=s[d3[i],d12[i]]+c33[i];
s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c34[i];
s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c35[i];
s[d4[i],d6[i]]:=s[d4[i],d6[i]]+c36[i];
s[d4[i],d7[i]]:= s[d4[i],d7[i]]+c37[i];
s[d4[i],d8[i]]:=s[d4[i],d8[i]]+c38[i];
s[d4[i],d9[i]]:= s[d4[i],d9[i]]+c39[i];
s[d4[i],d10[i]]:=s[d4[i],d10[i]]+c40[i];
s[d4[i],d11[i]]:= s[d4[i],d11[i]]+c41[i];
s[d4[i],d12[i]]:=s[d4[i],d12[i]]+c42[i];
s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c43[i];
s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c44[i];
s[d5[i],d7[i]]:=s[d5[i],d7[i]]+c45[i];
s[d5[i],d8[i]]:=s[d5[i],d8[i]]+c46[i];
s[d5[i],d9[i]]:=s[d5[i],d9[i]]+c47[i];
s[d5[i],d10[i]]:=s[d5[i],d10[i]]+c48[i];
s[d5[i],d11[i]]:=s[d5[i],d11[i]]+c49[i];
s[d5[i],d12[i]]:=s[d5[i],d12[i]]+c50[i];
s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c51[i];
s[d6[i],d7[i]]:=s[d6[i],d7[i]]+c52[i];
s[d6[i],d8[i]]:=s[d6[i],d8[i]]+c53[i];
s[d6[i],d9[i]]:=s[d6[i],d9[i]]+c54[i];
s[d6[i],d10[i]]:=s[d6[i],d10[i]]+c55[i];
s[d6[i],d11[i]]:=s[d6[i],d11[i]]+c56[i];
s[d6[i],d12[i]]:=s[d6[i],d12[i]]+c57[i];
s[d7[i],d7[i]]:=s[d7[i],d7[i]]+c58[i];
s[d7[i],d8[i]]:=s[d7[i],d8[i]]+c59[i];
s[d7[i],d9[i]]:=s[d7[i],d9[i]]+c60[i];
s[d7[i],d10[i]]:=s[d7[i],d10[i]]+c61[i];
s[d7[i],d11[i]]:=s[d7[i],d11[i]]+c62[i];
s[d7[i],d12[i]]:=s[d7[i],d12[i]]+c63[i];
s[d8[i],d8[i]]:=s[d8[i],d8[i]]+c64[i];
s[d8[i],d9[i]]:=s[d8[i],d9[i]]+c65[i];
s[d8[i],d10[i]]:=s[d8[i],d10[i]]+c66[i];
```

```
 s[d8[i],d11[i]]:=s[d8[i],d11[i]]+c67[i];
 s[d8[i],d12[i]]:=s[d8[i],d12[i]]+c68[i];
 s[d9[i],d9[i]]:=s[d9[i],d9[i]]+c69[i];
 s[d9[i],d10[i]]:=s[d9[i],d10[i]]+c70[i];
 s[d9[i],d11[i]]:=s[d9[i],d11[i]]+c71[i];
 s[d9[i],d12[i]]:=s[d9[i],d12[i]]+c72[i];
 s[d10[i],d10[i]]:=s[d10[i],d10[i]]+c73[i];
 s[d10[i],d11[i]]:=s[d10[i],d11[i]]+c74[i];
 s[d10[i],d12[i]]:=s[d10[i],d12[i]]+c75[i];
 s[d11[i],d11[i]]:=s[d11[i],d11[i]]+c76[i];
 s[d11[i],d12[i]]:=s[d11[i],d12[i]]+c77[i];
 s[d12[i],d12[i]]:=s[d12[i],d12[i]]+c78[i];
end;
 for i:=1 to sbt do
 for j:=1 to i-1 do     s[i,j]:=s[j,i];

(*Ghep cac vecto tai trong*);
for i:=1 to sbt do    f[i]:=ft[i]+fb[i]+fn[i];

(*Goi chuong trinh con de giai he FT*);
GHFT(s,f,qq,sbt);

(*Tinh ung suat tai trong tam cua FTHH*);
if(u<>0) then for i:=1 to u do  qq[v[u]]:=0;
for k:=1 to sf do
begin
for i:=1 to 6 do
for j:=1 to 12 do
begin  l[i,j]:=0;
for p:=1 to 6 do  l[i,j]:=l[i,j]+d[i,p]*b[p,j];
end;

m1[k]:=l[1,1]; m2[k]:=l[1,2]; m3[k]:=l[1,3]; m4[k]:=l[1,4]; m5[k]:=l[1,5];
m6[k]:=l[1,6];  m7[k]:=l[1,7];  m8[k]:=l[1,8]; m9[k]:=l[1,9]; m10[k]:=l[1,10];
m11[k]:=l[1,11];  m12[k]:=l[1,12]; h1[k]:=l[2,1];  h2[k]:=l[2,2];
h3[k]:=l[2,3];   h4[k]:=l[2,4];  h5[k]:=l[2,5];   h6[k]:=l[2,6];
h7[k]:=l[2,7];   h8[k]:=l[2,8];   h9[k]:=l[2,9];   h10[k]:=l[2,10];
h11[k]:=l[2,11];   h12[k]:=l[2,12]; b1[k]:=l[3,1];   b2[k]:=l[3,2];
 b3[k]:=l[3,3];    b4[k]:=l[3,4];    b5[k]:=l[3,5];   b6[k]:=l[3,6];
 b7[k]:=l[3,7];    b8[k]:=l[3,8];     b9[k]:=l[3,9];   b10[k]:=l[3,10];
 b11[k]:=l[3,11];  b12[k]:=l[3,12];  bb1[k]:=l[4,1];   bb2[k]:=l[4,2];
bb3[k]:=l[4,3];    bb4[k]:=l[4,4];   bb5[k]:=l[4,5];   bb6[k]:=l[4,6];
bb7[k]:=l[4,7];   bb8[k]:=l[4,8];    bb9[k]:=l[4,9];   bb10[k]:=l[4,10];
bb11[k]:=l[4,11];   bb12[k]:=l[4,12];  n1[k]:=l[5,1];   n2[k]:=l[5,2];
```

```
n3[k]:=l[5,3];  n4[k]:=l[5,4];   n5[k]:=l[5,5];   n6[k]:=l[5,6];
n7[k]:=l[5,7];  n8[k]:=l[5,8];   n9[k]:=l[5,9];  n10[k]:=l[5,10];
n11[k]:=l[5,11]; n12[k]:=l[5,12];   s1[k]:=l[6,1];
s2[k]:=l[6,2];  s3[k]:=l[6,3];  s4[k]:=l[6,4];   s5[k]:=l[6,5];
s6[k]:=l[6,6];  s7[k]:=l[6,7];  s8[k]:=l[6,8];   s9[k]:=l[6,9];
s10[k]:=l[6,10];   s11[k]:=l[6,11];  s12[k]:=l[6,12];
 us1[k]:=m1[k]*qq[d1[k]]+m2[k]*qq[d2[k]]+m3[k]*qq[d3[k]]+m4[k]*qq[d4[k]]+
 m5[k]*qq[d5[k]]+m6[k]*qq[d6[k]]+m7[k]*qq[d7[k]]+m8[k]*qq[d8[k]]+
 m9[k]*qq[d9[k]]+ m10[k]*qq[d10[k]]+m11[k]*qq[d11[k]]+ m12[k]*qq[d12[k]];

 us2[k]:=h1[k]*qq[d1[k]]+h2[k]*qq[d2[k]]+h3[k]*qq[d3[k]]+h4[k]*qq[d4[k]]+
 h5[k]*qq[d5[k]]+h6[k]*qq[d6[k]]+h7[k]*qq[d7[k]]+h8[k]*qq[d8[k]]+
 h9[k]*qq[d9[k]]+ h10[k]*qq[d10[k]]+h11[k]*qq[d11[k]]+ h12[k]*qq[d12[k]];

 us3[k]:=b1[k]*qq[d1[k]]+b2[k]*qq[d2[k]]+b3[k]*qq[d3[k]]+b4[k]*qq[d4[k]]+
 b5[k]*qq[d5[k]]+b6[k]*qq[d6[k]]+b7[k]*qq[d7[k]]+b8[k]*qq[d8[k]]+
 b9[k]*qq[d9[k]]+ b10[k]*qq[d10[k]]+b11[k]*qq[d11[k]]+ b12[k]*qq[d12[k]];

 us4[k]:=bb1[k]*qq[d1[k]]+bb2[k]*qq[d2[k]]+bb3[k]*qq[d3[k]]+bb4[k]*qq[d4[k]]+
 bb5[k]*qq[d5[k]]+bb6[k]*qq[d6[k]]+bb7[k]*qq[d7[k]]+bb8[k]*qq[d8[k]]+
 bb9[k]*qq[d9[k]]+ bb10[k]*qq[d10[k]]+bb11[k]*qq[d11[k]]+bb12[k]*qq[d12[k]];

 us5[k]:=n1[k]*qq[d1[k]]+n2[k]*qq[d2[k]]+n3[k]*qq[d3[k]]+n4[k]*qq[d4[k]]+
 n5[k]*qq[d5[k]]+n6[k]*qq[d6[k]]+n7[k]*qq[d7[k]]+n8[k]*qq[d8[k]]+
 n9[k]*qq[d9[k]]+ n10[k]*qq[d10[k]]+n11[k]*qq[d11[k]]+ n12[k]*qq[d12[k]];

 us6[k]:=s1[k]*qq[d1[k]]+s2[k]*qq[d2[k]]+s3[k]*qq[d3[k]]+s4[k]*qq[d4[k]]+
 s5[k]*qq[d5[k]]+s6[k]*qq[d6[k]]+s7[k]*qq[d7[k]]+s8[k]*qq[d8[k]]+
 s9[k]*qq[d9[k]]+ s10[k]*qq[d10[k]]+s11[k]*qq[d11[k]]+ s12[k]*qq[d12[k]];
end;

(*Doc ket qua*);
writeln ('chuyen vi');
for i:=1 to sbt do
writeln(qq[i]);
writeln ('us1');
for k:=1 to sf do
writeln(us1[k]);
writeln ('us2');
for k:=1 to sf do
writeln(us2[k]);
writeln ('us3');
for k:=1 to sf do
writeln(us3[k]);
```

```
writeln ('us4');
for k:=1 to sf do
writeln(us4[k]);
writeln ('us5');
for k:=1 to sf do
writeln(us5[k]);
writeln ('us6');
for k:=1 to sf do
writeln(us6[k]);
readln;
end.
```

```
Program CTR18_Tinh_khung_khong_gian;
Uses crt;
Type mt1=array[1..20,1..20] of real;  mt2=array[1..20] of real;
   mt3=array[1..20] of integer;
var k1,k2,l,l1,l2,l3,m,m1,m2,s,t,t1,t2,r,r1,r2,rc1,rc2,aa1:mt1;
   cx,cy,cz,xl,yl,zl,xk,yk,zk,xj,yj,zj,xkj,ykj,zkj,xkg,ykg,zkg,s1,s2,
   c1,c2,c3,d,x1,dt,cd,cd2,cd3,mqx,mqy,mqz,mx,aa,b,c,nl,q,qc,qt,f,fn,b1,b2,
   p1,o,cf,ct,pt,pf,v1,v2,v3,v4,v5,v6:mt2;
   g,d1,d2,d3,d4,d5,d6,d7,d8,d9,d10,d11,d12,n:mt3;
   i,j,k,p,st,sbt,tbt,sbk,x,y,z,w,ss,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12,
   z1,z2,z3,z4,z5:integer;  h,e:real;

Procedure TS( var m:mt1;a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12:integer);
begin  s[a1,a1]:= s[a1,a1]+m[1,1]; s[a1,a2]:= s[a1,a2]+m[1,2];
     s[a1,a3]:= s[a1,a3]+m[1,3]; s[a1,a4]:= s[a1,a4]+m[1,4];
     s[a1,a5]:= s[a1,a5]+m[1,5]; s[a1,a6]:= s[a1,a6]+m[1,6];
     s[a1,a7]:= s[a1,a7]+m[1,7]; s[a1,a8]:= s[a1,a8]+m[1,8];
     s[a1,a9]:= s[a1,a9]+m[1,9]; s[a1,a10]:= s[a1,a10]+m[1,10];
     s[a1,a11]:= s[a1,a11]+m[1,11];  s[a1,a12]:= s[a1,a12]+m[1,12];

     s[a2,a2]:= s[a2,a2]+m[2,2]; s[a2,a3]:= s[a2,a3]+m[2,3];
     s[a2,a4]:= s[a2,a4]+m[2,4];  s[a2,a5]:= s[a2,a5]+m[2,5];
     s[a2,a6]:= s[a2,a6]+m[2,6];  s[a2,a7]:= s[a2,a7]+m[2,7];
     s[a2,a8]:= s[a2,a8]+m[2,8];  s[a2,a9]:= s[a2,a9]+m[2,9];
     s[a2,a10]:= s[a2,a10]+m[2,10];  s[a2,a11]:= s[a2,a11]+m[2,11];
     s[a2,a12]:= s[a2,a12]+m[2,12];

     s[a3,a3]:= s[a3,a3]+m[3,3];   s[a3,a4]:= s[a3,a4]+m[3,4];
     s[a3,a5]:= s[a3,a5]+m[3,5];   s[a3,a6]:= s[a3,a6]+m[3,6];
     s[a3,a7]:= s[a3,a7]+m[3,7];   s[a3,a8]:= s[a3,a3]+m[3,8];
     s[a3,a9]:= s[a3,a9]+m[3,9];   s[a3,a10]:= s[a3,a10]+m[3,10];
     s[a3,a11]:= s[a3,a11]+m[3,11];   s[a3,a12]:= s[a3,a12]+m[3,12];

     s[a4,a4]:= s[a4,a4]+m[4,4];    s[a4,a5]:= s[a4,a5]+m[4,5];
     s[a4,a6]:= s[a4,a6]+m[4,6];    s[a4,a7]:= s[a4,a7]+m[4,7];
     s[a4,a8]:= s[a4,a8]+m[4,8];    s[a4,a9]:= s[a4,a9]+m[4,9];
     s[a4,a10]:= s[a4,a10]+m[4,10];    s[a4,a11]:= s[a4,a11]+m[4,11];
     s[a4,a12]:= s[a4,a12]+m[4,12];
     s[a5,a5]:= s[a5,a5]+m[5,5];    s[a5,a6]:= s[a5,a6]+m[5,6];
     s[a5,a7]:= s[a5,a7]+m[5,7];    s[a5,a8]:= s[a5,a8]+m[5,8];
     s[a5,a9]:= s[a5,a9]+m[5,9];    s[a5,a10]:= s[a5,a10]+m[5,10];
     s[a5,a11]:= s[a5,a11]+m[5,11];    s[a5,a12]:= s[a5,a12]+m[5,12];

     s[a6,a6]:= s[a6,a6]+m[6,6];    s[a6,a7]:= s[a6,a7]+m[6,7];
     s[a6,a8]:= s[a6,a8]+m[6,8];     s[a6,a9]:= s[a6,a9]+m[6,9];
```

```
      s[a6,a10]:= s[a6,a10]+m[6,10];   s[a6,a11]:= s[a6,a11]+m[6,11];
      s[a6,a12]:= s[a6,a12]+m[6,12];

      s[a7,a7]:= s[a7,a7]+m[7,7];   s[a7,a8]:= s[a7,a8]+m[7,8];
      s[a7,a9]:= s[a7,a9]+m[7,9];   s[a7,a10]:= s[a7,a10]+m[7,10];
      s[a7,a11]:= s[a7,a11]+m[7,11];   s[a7,a12]:= s[a7,a12]+m[7,12];

       s[a8,a8]:= s[a8,a8]+m[8,8];    s[a8,a9]:= s[a8,a9]+m[8,9];
      s[a8,a10]:= s[a8,a10]+m[8,10];    s[a8,a11]:= s[a8,a11]+m[8,11];
      s[a8,a12]:= s[a8,a12]+m[8,12];

      s[a9,a9]:= s[a9,a9]+m[9,9];    s[a9,a10]:= s[a9,a10]+m[9,10];
      s[a9,a11]:= s[a9,a11]+m[9,11];    s[a9,a12]:= s[a9,a12]+m[9,12];

      s[a10,a10]:= s[a10,a10]+m[10,10];  s[a10,a11]:= s[a10,a11]+m[10,11];
      s[a10,a12]:= s[a10,a12]+m[10,12];

     s[a11,a11]:= s[a11,a11]+m[11,11];  s[a11,a12]:= s[a11,a12]+m[11,12];

     s[a12,a12]:= s[a12,a12]+m[12,12];
end;
procedure tinhm1;
begin
if(x<>0) then for k:=1 to x do
begin
cd[k]:=sqrt(sqr(xl[k]-xj[k])+sqr(yl[k]-yj[k])+
sqr(zl[k]-zj[k]));
for i:=1 to 12 do
for j:=i to 12 do
begin
k1[1,1]:=e*dt[k]/cd[k]; k1[1,2]:=0; k1[1,3]:=0;k1[1,4]:=0;k1[1,5]:=0;
k1[1,6]:=0;k1[1,7]:=-k1[1,1]; k1[1,8]:=0; k1[1,9]:=0; k1[1,10]:=0;
k1[1,11]:=0; k1[1,12]:=0;
cd3[k]:=sqr(cd[k])*cd[k]; cd2[k]:=sqr(cd[k]);
k1[2,2]:=12*e*mqz[k]/cd3[k];k1[2,3]:=0; k1[2,4]:=0; k1[2,5]:=0;
k1[2,6]:=6*e*mqz[k]/cd2[k]; k1[2,7]:=0; k1[2,8]:=-k1[2,2];
k1[2,9]:=0;k1[2,10]:=0; k1[2,11]:=0; k1[2,12]:=k1[2,6];
k1[3,3]:=12*e*mqy[k]/cd3[k]; k1[3,4]:=0; k1[3,5]:=-6*e*mqy[k]/cd2[k];
k1[3,6]:=0;k1[3,7]:=0;k1[3,8]:=0; k1[3,9]:=-k1[3,3]; k1[3,10]:=0;
k1[3,11]:=k1[3,5]; k1[3,12]:=0;
k1[4,4]:=mx[k]*mqx[k]/cd[k];k1[4,5]:=0; k1[4,6]:=0; k1[4,7]:=0;
k1[4,8]:=0; k1[4,9]:=0; k1[4,10]:=-k1[4,4]; k1[4,11]:=0; k1[4,12]:=0;
k1[5,5]:=4*e*mqy[k]/cd[k];k1[5,6]:=0; k1[5,7]:=0; k1[5,8]:=0;
k1[5,9]:=6*e*mqy[k]/cd2[k]; k1[5,10]:=0;k1[5,11]:=2*e*mqy[k]/cd[k];
```

```
k1[5,12]:=0;
k1[6,6]:=4*e*mqz[k]/cd[k]; k1[6,7]:=0; k1[6,8]:=-6*e*mqz[k]/cd2[k];
k1[6,9]:=0;k1[6,10]:=0;k1[6,11]:=0; k1[6,12]:=2*e*mqz[k]/cd[k];
k1[7,7]:=k1[1,1];k1[7,8]:=0; k1[7,9]:=0; k1[7,10]:=0; k1[7,11]:=0;
k1[7,12]:=0;
k1[8,8]:=k1[2,2]; k1[8,9]:=0;k1[8,10]:=0;k1[8,11]:=0; k1[8,12]:=-k1[6,8];
k1[9,9]:=k1[3,3]; k1[9,10]:=0; k1[9,11]:=k1[5,9]; k1[9,12]:=0;
k1[10,10]:=k1[4,4]; k1[10,11]:=0; k1[10,12]:=0;
k1[11,11]:=k1[5,5]; k1[11,12]:=0;
k1[12,12]:=k1[6,6];
end;
      for i:=1 to 12 do
      for j:=1 to i-1 do  k1[i,j]:=k1[j,i];
      cx[k]:=(xl[k]-xj[k])/cd[k];
      cy[k]:=(yl[k]-yj[k])/cd[k];
      cz[k]:=(zl[k]-zj[k])/cd[k];
      xkj[k]:=xk[k]-xj[k];
      ykj[k]:=yk[k]-yj[k]; zkj[k]:=zk[k]-zj[k];
      aa[k]:=sqrt(sqr(cx[k])+sqr(cz[k])); xkg[k]:=cx[k]*
      xkj[k]+cy[k]*ykj[k]+cz[k]*zkj[k];
      ykg[k]:=(cx[k]*cy[k]*xkj[k])/aa[k]+aa[k]*ykj[k]-
      (cy[k]*cz[k]*zkj[k])/aa[k]; zkg[k]:=-(cz[k]*
      xkj[k])/aa[k]+(cx[k]*zkj[k])/aa[k];
      b[k]:=sqrt(sqr(ykg[k])+sqr(zkg[k])); s1[k]:=zkg[k]/b[k];
      c1[k]:=ykg[k]/b[k];
      for i:=1 to 3 do
      for j:=1 to 3 do
      begin
      t1[1,1]:=cx[k]; t1[1,2]:=cy[k]; t1[1,3]:=cz[k];
      t1[2,1]:=-(cx[k]*cy[k]*c1[k]-cz[k]*s1[k])/aa[k];
      t1[2,2]:=aa[k]*c1[k];
      t1[2,3]:=-(cy[k]*cz[k]*c1[k]+cx[k]*s1[k])/aa[k];
      t1[3,1]:=(cx[k]*cy[k]*s1[k]-cz[k]*c1[k])/aa[k];
      t1[3,2]:=-aa[k]*s1[k];
      t1[3,3]:=(cy[k]*cz[k]*s1[k]+cx[k]*c1[k])/aa[k];
      end;
for i:=1 to 12 do
for j:=1 to 12 do
begin
r1[1,1]:=t1[1,1]; r1[1,2]:=t1[1,2]; r1[1,3]:=t1[1,3]; r1[1,4]:=0; r1[1,5]:=0;
r1[1,6]:=0; r1[1,7]:=0; r1[1,8]:=0; r1[1,9]:=0; r1[1,10]:=0;
r1[1,11]:=0; r1[1,12]:=0;
r1[2,1]:=t1[2,1]; r1[2,2]:=t1[2,2]; r1[2,3]:=t1[2,3];r1[2,4]:=0;r1[2,5]:=0;
```

```
r1[2,6]:=0; r1[2,7]:=0; r1[2,8]:=0; r1[2,9]:=0; r1[2,10]:=0; r1[2,11]:=0;
r1[2,12]:=0;
r1[3,1]:=t1[3,1]; r1[3,2]:=t1[3,2]; r1[3,3]:=t1[3,3];r1[3,4]:=0;r1[3,5]:=0;
r1[3,6]:=0; r1[3,7]:=0; r1[3,8]:=0; r1[3,9]:=0; r1[3,10]:=0; r1[3,11]:=0;
r1[3,12]:=0;
r1[4,1]:=0;r1[4,2]:=0;r1[4,3]:=0; r1[4,4]:=abs(t1[1,1]);
r1[4,5]:=abs(t1[1,2]);r1[4,6]:=abs(t1[1,3]); r1[4,7]:=0; r1[4,8]:=0;
r1[4,9]:=0; r1[4,10]:=0;r1[4,11]:=0; r1[4,12]:=0;
r1[5,1]:=0;r1[5,2]:=0;r1[5,3]:=0;r1[5,4]:=abs(t1[2,1]);
r1[5,5]:=abs(t1[2,2]);r1[5,6]:=abs(t1[2,3]); r1[5,7]:=0; r1[5,8]:=0;
r1[5,9]:=0; r1[5,10]:=0;r1[5,11]:=0; r1[5,12]:=0;
r1[6,1]:=0;r1[6,2]:=0;r1[6,3]:=0;r1[6,4]:=abs(t1[3,1]);
r1[6,5]:=abs(t1[3,2]);r1[6,6]:=abs(t1[3,3]); r1[6,7]:=0; r1[6,8]:=0;
r1[6,9]:=0; r1[6,10]:=0;r1[6,11]:=0; r1[6,12]:=0;
r1[7,1]:=0;r1[7,2]:=0;r1[7,3]:=0;r1[7,4]:=0;r1[7,5]:=0;r1[7,6]:=0;
r1[7,7]:=t1[1,1];r1[7,8]:=t1[1,2];r1[7,9]:=t1[1,3];r1[7,10]:=0; r1[7,11]:=0;
r1[7,12]:=0;
r1[8,1]:=0;r1[8,2]:=0;r1[8,3]:=0;r1[8,4]:=0;r1[8,5]:=0;r1[8,6]:=0;
r1[8,7]:=t1[2,1]; r1[8,8]:=t1[2,2];r1[8,9]:=t1[2,3];r1[8,10]:=0;
r1[8,11]:=0; r1[8,12]:=0;
r1[9,1]:=0;r1[9,2]:=0;r1[9,3]:=0; r1[9,4]:=0;r1[9,5]:=0;r1[9,6]:=0;
r1[9,7]:=t1[3,1]; r1[9,8]:=t1[3,2];r1[9,9]:=t1[3,3]; r1[9,10]:=0;
r1[9,11]:=0; r1[9,12]:=0;
r1[10,1]:=0;r1[10,2]:=0;r1[10,3]:=0;r1[10,4]:=0; r1[10,5]:=0;r1[10,6]:=0;
r1[10,7]:=0;r1[10,8]:=0;r1[10,9]:=0;r1[10,10]:=abs(t1[1,1]);
r1[10,11]:=abs(t1[1,2]);r1[10,12]:=abs(t1[1,3]);
r1[11,1]:=0;r1[11,2]:=0;r1[11,3]:=0;r1[11,4]:=0;r1[11,5]:=0; r1[11,6]:=0;
r1[11,7]:=0;r1[11,8]:=0;r1[11,9]:=0; r1[11,10]:=abs(t1[2,1]);
r1[11,11]:=abs(t1[2,2]);r1[11,12]:=abs(t1[2,3]);
r1[12,1]:=0; r1[12,2]:=0;r1[12,3]:=0; r1[12,4]:=0;r1[12,5]:=0;r1[12,6]:=0;
r1[12,7]:=0;r1[12,8]:=0;r1[12,9]:=0; r1[12,10]:=abs(t1[3,1]);
r1[12,11]:=abs(t1[3,2]);r1[12,12]:=abs(t1[3,3]);
end;
      for i:=1 to 12 do
      for j:=1 to 12 do
      begin
      rc1[i,j]:=r1[j,i]; l1[i,j]:=0; for p:=1 to 12 do
      l1[i,j]:=l1[i,j]+rc1[i,p]*k1[p,j];
      end;
      for i:=1 to 12 do
      for j:=1 to 12 do
      begin
      m1[i,j]:=0; for p:=1 to 12 do
```

```
        m1[i,j]:=m1[i,j]+l1[i,p]*r1[p,j];
        end;
  end;
  end;
  procedure tinhm2;
  begin
  if(w<>0) then for k:=z4 to z5 do
  begin
  cd[k]:=sqrt(sqr(xl[k]-xj[k])+sqr(yl[k]-yj[k])+
  sqr(zl[k]-zj[k]));
  for i:=1 to 12 do
  for j:=i to 12 do
  begin
  k2[1,1]:=e*dt[k]/cd[k]; k2[1,2]:=0; k2[1,3]:=0;k2[1,4]:=0;k2[1,5]:=0;
  k2[1,6]:=0;k2[1,7]:=-k2[1,1]; k2[1,8]:=0; k2[1,9]:=0; k2[1,10]:=0;
  k2[1,11]:=0; k2[1,12]:=0;
  cd3[k]:=sqr(cd[k])*cd[k]; cd2[k]:=sqr(cd[k]);
  k2[2,2]:=12*e*mqz[k]/cd3[k];k2[2,3]:=0; k2[2,4]:=0; k2[2,5]:=0;
  k2[2,6]:=6*e*mqz[k]/cd2[k]; k2[2,7]:=0; k2[2,8]:=-k2[2,2];
  k2[2,9]:=0;k2[2,10]:=0; k2[2,11]:=0; k2[2,12]:=k2[2,6];
  k2[3,3]:=12*e*mqy[k]/cd3[k]; k2[3,4]:=0; k2[3,5]:=-6*e*mqy[k]/cd2[k];
  k2[3,6]:=0;k2[3,7]:=0;k2[3,8]:=0; k2[3,9]:=-k2[3,3]; k2[3,10]:=0;
  k2[3,11]:=k2[3,5]; k2[3,12]:=0;
  k2[4,4]:=mx[k]*mqx[k]/cd[k];k2[4,5]:=0; k2[4,6]:=0; k2[4,7]:=0;
  k2[4,8]:=0; k2[4,9]:=0; k2[4,10]:=-k2[4,4]; k2[4,11]:=0; k2[4,12]:=0;
  k2[5,5]:=4*e*mqy[k]/cd[k];k2[5,6]:=0; k2[5,7]:=0; k2[5,8]:=0;
  k2[5,9]:=6*e*mqy[k]/cd2[k]; k2[5,10]:=0;k2[5,11]:=2*e*mqy[k]/cd[k];
  k2[5,12]:=0;
  k2[6,6]:=4*e*mqz[k]/cd[k]; k2[6,7]:=0; k2[6,8]:=-6*e*mqz[k]/cd2[k];
  k2[6,9]:=0;k2[6,10]:=0;k2[6,11]:=0; k2[6,12]:=2*e*mqz[k]/cd[k];
  k2[7,7]:=k2[1,1];k2[7,8]:=0; k2[7,9]:=0; k2[7,10]:=0;  k2[7,11]:=0;
  k2[7,12]:=0;
  k2[8,8]:=k2[2,2]; k2[8,9]:=0;k2[8,10]:=0;k2[8,11]:=0; k2[8,12]:=-k2[6,8];
  k2[9,9]:=k2[3,3]; k2[9,10]:=0; k2[9,11]:=k2[5,9];  k2[9,12]:=0;
  k2[10,10]:=k2[4,4]; k2[10,11]:=0;  k2[10,12]:=0;
  k2[11,11]:=k2[5,5]; k2[11,12]:=0;
  k2[12,12]:=k2[6,6];
  end;
       for i:=1 to 12 do
       for j:=1 to i-1 do  k2[i,j]:=k2[j,i];
      b1[k]:=sqrt(sqr(xk[k])+sqr(zk[k])); s2[k]:=zk[k]/b1[k];
      c2[k]:=xk[k]/b1[k];
      for i:=1 to 3 do
      for j:=1 to 3 do
```

```
      begin
      t2[1,1]:=0; t2[1,2]:=1; t2[1,3]:=0;
      t2[2,1]:=-c2[k];t2[2,2]:=0; t2[2,3]:=s2[k]; t2[3,1]:=s2[k];
      t2[3,2]:=0; t2[3,3]:=c2[k];
      end;
for i:=1 to 12 do
for j:=1 to 12 do
begin
r2[1,1]:=t2[1,1]; r2[1,2]:=t2[1,2]; r2[1,3]:=t2[1,3]; r2[1,4]:=0; r2[1,5]:=0;
r2[1,6]:=0;  r2[1,7]:=0;  r2[1,8]:=0;  r2[1,9]:=0;  r2[1,10]:=0;
r2[1,11]:=0;  r2[1,12]:=0;
r2[2,1]:=t2[2,1];  r2[2,2]:=t2[2,2]; r2[2,3]:=t2[2,3];r2[2,4]:=0;r2[2,5]:=0;
r2[2,6]:=0; r2[2,7]:=0; r2[2,8]:=0; r2[2,9]:=0; r2[2,10]:=0;  r2[2,11]:=0;
r2[2,12]:=0;
r2[3,1]:=t2[3,1]; r2[3,2]:=t2[3,2];  r2[3,3]:=t2[3,3];r2[3,4]:=0;r2[3,5]:=0;
r2[3,6]:=0; r2[3,7]:=0;  r2[3,8]:=0;  r2[3,9]:=0;  r2[3,10]:=0;  r2[3,11]:=0;
r2[3,12]:=0;
r2[4,1]:=0;r2[4,2]:=0;r2[4,3]:=0; r2[4,4]:=abs(t2[1,1]);
r2[4,5]:=abs(t2[1,2]);r2[4,6]:=abs(t2[1,3]); r2[4,7]:=0; r2[4,8]:=0;
r2[4,9]:=0;  r2[4,10]:=0;r2[4,11]:=0; r2[4,12]:=0;
r2[5,1]:=0;r2[5,2]:=0;r2[5,3]:=0; r2[5,4]:=abs(t2[2,1]);
r2[5,5]:=abs(t2[2,2]); r2[5,6]:=abs(t2[2,3]); r2[5,7]:=0; r2[5,8]:=0;
r2[5,9]:=0;  r2[5,10]:=0;r2[5,11]:=0;  r2[5,12]:=0;
r2[6,1]:=0;r2[6,2]:=0;r2[6,3]:=0; r2[6,4]:=abs(t2[3,1]);
r2[6,5]:=abs(t2[3,2]);r2[6,6]:=abs(t2[3,3]); r2[6,7]:=0;  r2[6,8]:=0;
r2[6,9]:=0;  r2[6,10]:=0; r2[6,11]:=0; r2[6,12]:=0;
r2[7,1]:=0;r2[7,2]:=0;r2[7,3]:=0;r2[7,4]:=0;r2[7,5]:=0;r2[7,6]:=0;
r2[7,7]:=t2[1,1];r2[7,8]:=t2[1,2];r2[7,9]:=t2[1,3];r2[7,10]:=0; r2[7,11]:=0;
r2[7,12]:=0;
r2[8,1]:=0;r2[8,2]:=0;r2[8,3]:=0;r2[8,4]:=0;r2[8,5]:=0;r2[8,6]:=0;
r2[8,7]:=t2[2,1];  r2[8,8]:=t2[2,2];r2[8,9]:=t2[2,3];r2[8,10]:=0;
r2[8,11]:=0;  r2[8,12]:=0;
r2[9,1]:=0;r2[9,2]:=0;r2[9,3]:=0; r2[9,4]:=0;r2[9,5]:=0;r2[9,6]:=0;
r2[9,7]:=t2[3,1]; r2[9,8]:=t2[3,2];r2[9,9]:=t2[3,3]; r2[9,10]:=0;
r2[9,11]:=0; r2[9,12]:=0;
r2[10,1]:=0;r2[10,2]:=0;r2[10,3]:=0;r2[10,4]:=0; r2[10,5]:=0;r2[10,6]:=0;
r2[10,7]:=0;r2[10,8]:=0;r2[10,9]:=0; r2[10,10]:=abs(t2[1,1]);
r2[10,11]:=abs(t2[1,2]);r2[10,12]:=abs(t2[1,3]);
r2[11,1]:=0;r2[11,2]:=0;r2[11,3]:=0;r2[11,4]:=0;r2[11,5]:=0; r2[11,6]:=0;
r2[11,7]:=0;r2[11,8]:=0;r2[11,9]:=0; r2[11,10]:=abs(t2[2,1]);
r2[11,11]:=abs(t2[2,2]);r2[11,12]:=abs(t2[2,3]);
r2[12,1]:=0; r2[12,2]:=0;r2[12,3]:=0; r2[12,4]:=0;r2[12,5]:=0;r2[12,6]:=0;
r2[12,7]:=0;r2[12,8]:=0;r2[12,9]:=0; r2[12,10]:=abs(t2[3,1]);
```

```
r2[12,11]:=abs(t2[3,2]);r2[12,12]:=abs(t2[3,3]);
end;
      for i:=1 to 12 do
      for j:=1 to 12 do
      begin
      rc2[i,j]:=r2[j,i]; l2[i,j]:=0;  for p:=1 to 12 do
      l2[i,j]:=l2[i,j]+rc2[i,p]*k2[p,j];
      end;
      for i:=1 to 12 do
     for j:=1 to 12 do
      begin
      m2[i,j]:=0;  for p:=1 to 12 do
      m2[i,j]:=m2[i,j]+l2[i,p]*r2[p,j];
      end;
end;
end;
Procedure tinhvt;
begin
if(y<>0) then for k:=1 to y do
begin
v1[k]:=cf[k]*cd[k]/2; v2[k]:=cf[k]*sqr(cd[k])/12;
f[d1[k]]:=f[d1[k]]+((t1[2,1])*v1[k]);
f[d2[k]]:=f[d2[k]]+((t1[2,2])*cf[k]);
f[d3[k]]:=f[d3[k]]+((t1[2,3])*v1[k]);
f[d4[k]]:=f[d4[k]]+(abs(t1[3,1])*v2[k]);
f[d5[k]]:=f[d5[k]]+(abs(t1[3,2])*v2[k]);
f[d6[k]]:=f[d6[k]]+(abs(t1[3,3])*v2[k]);
f[d7[k]]:=f[d7[k]]+((t1[2,1])*v1[k]);
f[d8[k]]:=f[d8[k]]+((t1[2,1])*v1[k]);
f[d9[k]]:=f[d9[k]]+((t1[2,3])*v1[k]);
f[d10[k]]:=f[d10[k]]-(abs(t1[3,1])*v2[k]);
f[d11[k]]:=f[d11[k]]-(abs(t1[3,2])*v2[k]);
f[d12[k]]:=f[d12[k]]-(abs(t1[3,3])*v2[k]);
end;
if(z<>0) then for k:=z1 to z2 do
begin
v3[k]:=ct[k]*sqr(pf[k])*(2*pt[k]+cd[k])/cd3[k];
v4[k]:=ct[k]*pt[k]*sqr(pf[k])/sqr(cd[k]);
v5[k]:=ct[k]*sqr(pt[k])*(cd[k]+2*pf[k])/cd3[k];
v6[k]:=ct[k]*pf[k]*sqr(pt[k])/sqr(cd[k]);
cd3[k]:=sqr(cd[k])*cd[k];
f[d1[k]]:=f[d1[k]]+((t1[2,1])*v3[k]);
f[d2[k]]:=f[d2[k]]+((t1[2,2])*v3[k]);
f[d3[k]]:=f[d3[k]]+((t1[2,3])*v3[k]);
```

```
f[d4[k]]:=f[d4[k]]+(abs(t1[3,1])*v4[k]);
f[d5[k]]:=f[d5[k]]+(abs(t1[3,2])*v4[k]);
f[d6[k]]:=f[d6[k]]+(abs(t1[3,3])*v4[k]);
f[d7[k]]:=f[d7[k]]+((t1[2,1])*v5[k]);
f[d8[k]]:=f[d8[k]]+((t1[2,2])*v5[k]);
f[d9[k]]:=f[d9[k]]+((t1[2,3])*v5[k]);
f[d10[k]]:=f[d10[k]]-(abs(t1[3,1])*v6[k]);
f[d11[k]]:=f[d11[k]]-(abs(t1[3,2])*v6[k]);
f[d12[k]]:=f[d12[k]]-(abs(t1[3,3])*v6[k]);
end;
end;
Procedure GHFT(a:mt1;b:mt2; var x:mt2; n:integer);
var     i,j,k,s:integer; q,r:real ;
begin
 s:=0;
 REPEAT
     s:=s+1;
     for i:= s+1 to n do
      Begin
        if(a[s,s]<>0) then
        q:=a[s,i]/a[s,s];
        for j:=i to n do
         a[i,j]:= a[i,j]-a[s,j]*q ; b[i]:=b[i]-b[s]*q;
       End
 UNTIL(s= n -1);
  x[n]:=b[n]/a[n,n];
  for i:= n -1  downto 1 do
     Begin
        r :=0;
        for j:= n  downto i+1 do r:=r+a[i,j]*x[j];
        if(a[i,i]<>0) then
        x[i]:= (b[i]-r)/ a[i,i];
     End;
end;
Procedure Tinhcv(var qc,qt:mt2;r:mt1;a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12:
        integer);
begin
       qc[a1]:=r[1,1]*qt[a1]+r[1,2]*qt[a2]+r[1,3]*qt[a3]+r[1,4]*qt[a4]+
       r[1,5]*qt[a5]+r[1,6]*qt[a6]++r[1,7]*qt[a7]+r[1,8]*qt[a8]+
       r[1,9]*qt[a9]+r[1,10]*qt[a10]+r[1,11]*qt[a11]+r[1,12]*qt[a12];

       qc[a2]:=r[2,1]*qt[a1]+r[2,2]*qt[a2]+r[2,3]*qt[a3]+r[2,4]*qt[a4]+
       r[2,5]*qt[a5]+r[2,6]*qt[a6]++r[2,7]*qt[a7]+r[2,8]*qt[a8]+
       r[2,9]*qt[a9]+r[2,10]*qt[a10]+r[2,11]*qt[a11]+r[2,12]*qt[a12];
```

```
        qc[a3]:=r[3,1]*qt[a1]+r[3,2]*qt[a2]+r[3,3]*qt[a3]+r[3,4]*qt[a4]+
        r[3,5]*qt[a5]+r[3,6]*qt[a6]++r[3,7]*qt[a7]+r[3,8]*qt[a8]+
        r[3,9]*qt[a9]+r[3,10]*qt[a10]+r[3,11]*qt[a11]+r[3,12]*qt[a12];

        qc[a4]:=r[4,1]*qt[a1]+r[4,2]*qt[a2]+r[4,3]*qt[a3]+r[4,4]*qt[a4]+
        r[4,5]*qt[a5]+r[4,6]*qt[a6]++r[4,7]*qt[a7]+r[4,8]*qt[a8]+
        r[4,9]*qt[a9]+r[4,10]*qt[a10]+r[4,11]*qt[a11]+r[4,12]*qt[a12];

        qc[a5]:=r[5,1]*qt[a1]+r[5,2]*qt[a2]+r[5,3]*qt[a3]+r[5,4]*qt[a4]+
        r[5,5]*qt[a5]+r[5,6]*qt[a6]++r[5,7]*qt[a7]+r[5,8]*qt[a8]+
        r[5,9]*qt[a9]+r[5,10]*qt[a10]+r[5,11]*qt[a11]+r[5,12]*qt[a12];

        qc[a6]:=r[6,1]*qt[a1]+r[6,2]*qt[a2]+r[6,3]*qt[a3]+r[6,4]*qt[a4]+
        r[6,5]*qt[a5]+r[6,6]*qt[a6]++r[6,7]*qt[a7]+r[6,8]*qt[a8]+
        r[6,9]*qt[a9]+r[6,10]*qt[a10]+r[6,11]*qt[a11]+r[6,12]*qt[a12];

        qc[a7]:=r[7,1]*qt[a1]+r[7,2]*qt[a2]+r[7,3]*qt[a3]+r[7,4]*qt[a4]+
        r[7,5]*qt[a5]+r[7,6]*qt[a6]++r[7,7]*qt[a7]+r[7,8]*qt[a8]+
        r[7,9]*qt[a9]+r[7,10]*qt[a10]+r[7,11]*qt[a11]+r[7,12]*qt[a12];

        qc[a8]:=r[8,1]*qt[a1]+r[8,2]*qt[a2]+r[8,3]*qt[a3]+r[8,4]*qt[a4]+
        r[8,5]*qt[a5]+r[8,6]*qt[a6]++r[8,7]*qt[a7]+r[8,8]*qt[a8]+
        r[8,9]*qt[a9]+r[8,10]*qt[a10]+r[8,11]*qt[a11]+r[8,12]*qt[a12];

        qc[a9]:=r[9,1]*qt[a1]+r[9,2]*qt[a2]+r[9,3]*qt[a3]+r[9,4]*qt[a4]+
        r[9,5]*qt[a5]+r[9,6]*qt[a6]++r[9,7]*qt[a7]+r[9,8]*qt[a8]+
        r[9,9]*qt[a9]+r[9,10]*qt[a10]+r[9,11]*qt[a11]+r[9,12]*qt[a12];

        qc[a10]:=r[10,1]*qt[a1]+r[10,2]*qt[a2]+r[10,3]*qt[a3]+r[10,4]*qt[a4]+
        r[10,5]*qt[a5]+r[10,6]*qt[a6]++r[10,7]*qt[a7]+r[10,8]*qt[a8]+
        r[10,9]*qt[a9]+r[10,10]*qt[a10]+r[10,11]*qt[a11]+r[10,12]*qt[a12];

        qc[a11]:=r[11,1]*qt[a1]+r[11,2]*qt[a2]+r[11,3]*qt[a3]+
        r[11,4]*qt[a4]+r[11,5]*qt[a5]+r[11,6]*qt[a6]+
        r[11,7]*qt[a7]+r[11,8]*qt[a8]+r[11,9]*qt[a9]+
        r[11,10]*qt[a10]+r[11,11]*qt[a11]+r[11,12]*qt[a12];

        qc[a12]:=r[12,1]*qt[a1]+r[12,2]*qt[a2]+r[12,3]*qt[a3]+
        r[12,4]*qt[a4]+r[12,5]*qt[a5]+r[12,6]*qt[a6]++r[12,7]*qt[a7]+
        r[12,8]*qt[a8]+r[12,9]*qt[a9]+r[12,10]*qt[a10]+r[12,11]*qt[a11]+
        r[12,12]*qt[a12];
end;
Procedure Tinhnl(var nl,qc:mt2;k:mt1;a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12:
        integer);
```

```
begin
    nl[a1]:=k[1,1]*qc[a1]+k[1,2]*qc[a2]+k[1,3]*qc[a3]+k[1,4]*qc[a4]+
    k[1,5]*qc[a5]+k[1,6]*qc[a6]++k[1,7]*qc[a7]+k[1,8]*qc[a8]+
    k[1,9]*qc[a9]+k[1,10]*qc[a10]+k[1,11]*qc[a11]+k[1,12]*qc[a12];

    nl[a2]:=k[2,1]*qc[a1]+k[2,2]*qc[a2]+k[2,3]*qc[a3]+k[2,4]*qc[a4]+
    k[2,5]*qc[a5]+k[2,6]*qc[a6]++k[2,7]*qc[a7]+k[2,8]*qc[a8]+
    k[2,9]*qc[a9]+k[2,10]*qc[a10]+k[2,11]*qc[a11]+k[2,12]*qc[a12];

    nl[a3]:=k[3,1]*qc[a1]+k[3,2]*qc[a2]+k[3,3]*qc[a3]+k[3,4]*qc[a4]+
    k[3,5]*qc[a5]+k[3,6]*qc[a6]++k[3,7]*qc[a7]+k[3,8]*qc[a8]+
    k[3,9]*qc[a9]+k[3,10]*qc[a10]+k[3,11]*qc[a11]+k[3,12]*qc[a12];

    nl[a4]:=k[4,1]*qc[a1]+k[4,2]*qc[a2]+k[4,3]*qc[a3]+k[4,4]*qc[a4]+
    k[4,5]*qc[a5]+k[4,6]*qc[a6]++k[4,7]*qc[a7]+k[4,8]*qc[a8]+
    k[4,9]*qc[a9]+k[4,10]*qc[a10]+k[4,11]*qc[a11]+k[4,12]*qc[a12];

    nl[a5]:=k[5,1]*qc[a1]+k[5,2]*qc[a2]+k[5,3]*qc[a3]+k[5,4]*qc[a4]+
    k[5,5]*qc[a5]+k[5,6]*qc[a6]++k[5,7]*qc[a7]+k[5,8]*qc[a8]+
    k[5,9]*qc[a9]+k[5,10]*qc[a10]+k[5,11]*qc[a11]+k[5,12]*qc[a12];

    nl[a6]:=k[6,1]*qc[a1]+k[6,2]*qc[a2]+k[6,3]*qc[a3]+k[6,4]*qc[a4]+
    k[6,5]*qc[a5]+k[6,6]*qc[a6]++k[6,7]*qc[a7]+k[6,8]*qc[a8]+
    k[6,9]*qc[a9]+k[6,10]*qc[a10]+k[6,11]*qc[a11]+k[6,12]*qc[a12];

    nl[a7]:=k[7,1]*qc[a1]+k[7,2]*qc[a2]+k[7,3]*qc[a3]+k[7,4]*qc[a4]+
    k[7,5]*qc[a5]+k[7,6]*qc[a6]++k[7,7]*qc[a7]+k[7,8]*qc[a8]+
    k[7,9]*qc[a9]+k[7,10]*qc[a10]+k[7,11]*qc[a11]+k[7,12]*qc[a12];

    nl[a8]:=k[8,1]*qc[a1]+k[8,2]*qc[a2]+k[8,3]*qc[a3]+k[8,4]*qc[a4]+
    k[8,5]*qc[a5]+k[8,6]*qc[a6]++k[8,7]*qc[a7]+k[8,8]*qc[a8]+
    k[8,9]*qc[a9]+k[8,10]*qc[a10]+k[8,11]*qc[a11]+k[8,12]*qc[a12];

    nl[a9]:=k[9,1]*qc[a1]+k[9,2]*qc[a2]+k[9,3]*qc[a3]+k[9,4]*qc[a4]+
    k[9,5]*qc[a5]+k[9,6]*qc[a6]++k[9,7]*qc[a7]+k[9,8]*qc[a8]+
    k[9,9]*qc[a9]+k[9,10]*qc[a10]+k[9,11]*qc[a11]+k[9,12]*qc[a12];

    nl[a10]:=k[10,1]*qc[a1]+k[10,2]*qc[a2]+k[10,3]*qc[a3]+
    k[10,4]*qc[a4]+k[10,5]*qc[a5]+k[10,6]*qc[a6]+
    k[10,7]*qc[a7]+k[10,8]*qc[a8]+k[10,9]*qc[a9]+
    k[10,10]*qc[a10]+k[10,11]*qc[a11]+k[10,12]*qc[a12];

    nl[a11]:=k[11,1]*qc[a1]+k[11,2]*qc[a2]+k[11,3]*qc[a3]+
    k[11,4]*qc[a4]+k[11,5]*qc[a5]+k[11,6]*qc[a6]+
```

```
        k[11,7]*qc[a7]+k[11,8]*qc[a8]+k[11,9]*qc[a9]+
        k[11,10]*qc[a10]+k[11,11]*qc[a11]+k[11,12]*qc[a12];

        nl[a12]:=k[12,1]*qc[a1]+k[12,2]*qc[a2]+k[12,3]*qc[a3]+
        k[12,4]*qc[a4]+k[12,5]*qc[a5]+k[12,6]*qc[a6]+
        k[12,7]*qc[a7]+k[12,8]*qc[a8]+k[12,9]*qc[a9]+
        k[12,10]*qc[a10]+k[12,11]*qc[a11]+k[12,12]*qc[a12];
end;

Begin Clrscr;
(*Nguoi lap trinh:Vo nhu Cau*);
writeln('so thanh');
readln(st);
writeln('so bac tu do');
readln(sbt);
writeln('tong so bac tu do');
readln(tbt);
writeln('so bac tu do khong co chuyen vi');
readln(sbk);
writeln('so thu tu BTD khong co chuyen vi');
if(sbk<>0) then for i:=1 to sbk do
readln(g[i]);
writeln('modun dan hoi');
readln(e);
writeln('so thanh loai 1');
readln(x);
writeln('so thanh loai 2');
readln(w);
writeln('so thanh chiu tai trong fan bo deu');
readln(y);
writeln('so thanh chiu tai trong tap trung');
readln(z);
if(y<>0) then for i:=1 to y do
begin
writeln('cuong do tai trong');
readln(cf[i]);
end;
if(z<>0) then for i:=z1 to z2 do
begin
writeln('tai trongtap trung');
readln(ct[i]);
writeln('a1');
readln(pt[i]);
writeln('b1');
```

```
readln(pf[i]);
end;
writeln('dien tich');
for i:=1 to st do
readln(dt[i]);
writeln('modun xoan');
for i:=1 to st do
readln(mx[i]);
writeln('momen quan tinh x');
for i:=1 to st do
readln(mqx[i]);
writeln('momen quan tinh y');
for i:=1 to st do
readln(mqy[i]);
writeln('momen quan tinh z');
for i:=1 to st do
readln(mqz[i]);
writeln('xj');
for i:=1 to st do
readln(xj[i]);
writeln('yj');
for i:=1 to st do
readln(yj[i]);
writeln('zj');
for i:=1 to st do
readln(zj[i]);
writeln('xl');
for i:=1 to st do
readln(xl[i]);
writeln('yl');
for i:=1 to st do
readln(yl[i]);
writeln('zl');
for i:=1 to st do
readln(zl[i]);
writeln('toa do diem xk');
for i:=1 to st do
readln(xk[i]);
writeln('toa do diem yk');
for i:=1 to st do
readln(yk[i]);
writeln('toa do diem zk');
for i:=1 to st do
readln(zk[i]);
```

```
writeln('BTD d1');
for i:=1 to st do
readln(d1[i]);
writeln('BTD d2');
for i:=1 to st do
readln(d2[i]);
writeln('BTD d3');
for i:=1 to st do
readln(d3[i]);
writeln('BTD d4');
for i:=1 to st do
readln(d4[i]);
writeln('BTD d5');
for i:=1 to st do
readln(d5[i]);
writeln('BTD d6');
for i:=1 to st do
readln(d6[i]);
writeln('BTD d7');
for i:=1 to st do
readln(d7[i]);
writeln('BTD d8');
for i:=1 to st do
readln(d8[i]);
writeln('BTD d9');
for i:=1 to st do
readln(d9[i]);
writeln('BTD d10');
for i:=1 to st do
readln(d10[i]);
writeln('BTD d11');
for i:=1 to st do
readln(d11[i]);
writeln('BTD d12');
for i:=1 to st do
readln(d12[i]);
writeln('thanh fan tai trong');
for i:=1 to sbt do
readln(fn[i]);

z1:=y+1;  z2:=y+z;  z3:=z2+1;  z4:=x+1; z5:=x+w;
tinhm1;
if(x<>0) then for k:=1 to x do
```

```
begin
a1:=d1[k];a2:=d2[k];a3:=d3[k]; a4:=d4[k]; a5:=d5[k];
a6:=d6[k];  a7:=d7[k]; a8:=d8[k]; a9:=d9[k];
a10:=d10[k];a11:=d11[k];  a12:=d12[k];
for k:=1 to x do
begin
for i:=1 to 12 do
for j:=i to 12 do   m[i,j]:=m1[i,j];
end;
TS(m1,a1,a2,a3,a4,a5,a6,a7,a8,a9,10,a11,a12);
end;
tinhm2;
if(w<>0) then  for k:=z4 to z5 do
begin
a1:=d1[k];a2:=d2[k];a3:=d3[k]; a4:=d4[k]; a5:=d5[k];
a6:=d6[k];  a7:=d7[k]; a8:=d8[k]; a9:=d9[k];
a10:=d10[k];a11:=d11[k];  a12:=d12[k];
for k:=z4 to z5 do
begin
for i:=1 to 12 do
for j:=i to 12 do   m[i,j]:=m2[i,j];
end;
TS(m2,a1,a2,a3,a4,a5,a6,a7,a8,a9,10,a11,a12);
end;
      for i:=1 to sbt do
      for j:=1 to i-1 do    s[i,j]:=s[j,i];
tinhvt;

(*Goi chuong trinh con giai he FT*);
  GHFT(s,f,qt,sbt);

(*Tinh chuyen vi 2 loai thanh*);
if(x<>0) then for k:=1 to x do
       begin
       a1:=d1[k]; a2:=d2[k]; a3:=d3[k]; a4:=d4[k];
       a5:=d5[k];  a6:=d6[k]; a7:=d7[k];  a8:=d8[k];
       a9:=d9[k];  a10:=d10[k]; a11:=d11[k];  a12:=d12[k];
       tinhcv(qc,qt,r1,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12);;
       end;
 if(w<>0) then for k:=z4 to z5 do
       begin
       a1:=d1[k]; a2:=d2[k]; a3:=d3[k]; a4:=d4[k];
       a5:=d5[k]; a6:=d6[k]; a7:=d7[k];  a8:=d8[k];
       a9:=d9[k];  a10:=d10[k];a11:=d11[k]; a12:=d12[k];
```

```
        tinhcv(qc,qt,r2,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12);
        end;

  (*Tinh noi luc trong 2 loai thanh*);
        if(sbk<>0) then for i:=1 to sbk do qc[g[i]]:=0;
        if(x<>0) then for k:=1 to x do
        begin
        a1:=d1[k]; a2:=d2[k]; a3:=d3[k]; a4:=d4[k];
        a5:=d5[k]; a6:=d6[k]; a7:=d7[k]; a8:=d8[k];
        a9:=d9[k]; a10:=d10[k]; a11:=d11[k]; a12:=d12[k];
        tinhnl(nl,qc,k1,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12);;
        end;
      if(w<>0) then for k:=z4 to z5 do
      begin
      a1:=d1[k]; a2:=d2[k]; a3:=d3[k]; a4:=d4[k];
      a5:=d5[k]; a6:=d6[k]; a7:=d7[k]; a8:=d8[k];
      a9:=d9[k]; a10:=d10[k]; a11:=d11[k]; a12:=d12[k];
      Tinhnl(nl,qc,k2,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10,a11,a12);
      end;
 if(y<>0) then for k:=1 to y do
 begin
 nl[d2[k]]:=nl[d2[k]]-(cf[k]*cd[k]/2);
 nl[d6[k]]:=nl[d6[k]]-(cf[k]*sqr(cd[k])/12);
 nl[d8[k]]:=nl[d8[k]]-(cf[k]*cd[k]/2);
 nl[d12[k]]:=nl[d12[k]]+(cf[k]*sqr(cd[k])/12);
 end;
 if(z<>0) then for k:=z1 to z2 do
 begin
 nl[d2[k]]:=nl[d2[k]]-(ct[k]*sqr(pf[k])*(2*pt[k]+
 cd[k])/cd3[k]);
 nl[d6[k]]:=nl[d6[k]]-(ct[k]*pt[k]*sqr(pf[k])/sqr(cd[k]));
 nl[d8[k]]:=nl[d8[k]]-(ct[k]*sqr(pt[k])*(cd[k]+
 2*pf[k])/cd3[k]);
 nl[d12[k]]:=nl[d12[k]]+(ct[k]*pf[k]*sqr(pt[k])/sqr(cd[k]));
 end;

 (*Doc ket qua*);
 writeln('chuyen vi');
 for i:=1 to sbt do
 writeln(qt[i]);
 writeln('noi luc fb');
 if(y<>0) then for k:=1 to y do
 begin
 writeln(nl[d2[k]]);
```

```
writeln(nl[d4[k]]);
writeln(nl[d6[k]]);
writeln(nl[d8[k]]);
writeln(nl[d10[k]]);
writeln(nl[d12[k]]);
end;
writeln('noi luc tt');
if(z<>0) then for k:=z1 to z2 do
begin
writeln(nl[d2[k]]);
writeln(nl[d4[k]]);
writeln(nl[d6[k]]);
writeln(nl[d8[k]]);
writeln(nl[d10[k]]);
writeln(nl[d12[k]]);
end;
writeln('noi luc ktt ');
for k:=z3 to x do
begin
writeln(nl[d2[k]]);
writeln(nl[d4[k]]);
writeln(nl[d6[k]]);
writeln(nl[d8[k]]);
writeln(nl[d10[k]]);
writeln(nl[d12[k]]);
end;
writeln('noi luc trong cot');
if(w<>0) then for k:=z4 to z5 do
begin
writeln(nl[d1[k]]);
writeln(nl[d5[k]]);
writeln(nl[d6[k]]);
writeln(nl[d7[k]]);
writeln(nl[d11[k]]);
writeln(nl[d12[k]]);
end;
readln;
end.
```

```
Program CTR19_Tinh_gia_tri_rieng_lon_nhat_cho_he_gian;
Uses crt;
Type
  mt1= array[1..10,1..10 ] of real ; mt2= array[1..10] of real ;
Var  i,j,k,p,sn,st,sbt,n:integer; d1,d2,d3,d4:array[1..10] of integer;
   c1,c2,b1,e1,d,cd,dt,e,y,vtrn,l,mm,x1,x2,y1,y2:mt2;
   s,m,a,u,b,x:mt1;
   tt,gtrln,c:real;
Procedure NDMT(var a,u:mt1;n:integer);
 Var    i,j,p :integer;  c:real;
begin
p:=0;
REPEAT
      p:=p+1;
      if(a[p,p]<>0)then
      c:=1/a[p,p];
      for j:=1 to n do
        begin
          a[p,j]:=a[p,j]*c;
          U[p,j]:=U[p,j]*c;
        end;
      for i:=1 to n do
      if(i<>p) then
        begin
          c:=a[i,p];
          for j:=1 to n do
           begin
            a[i,j]:=a[i,j]-a[p,j]*c;
            U[i,j]:=U[i,j]-U[p,j]*c;
           end;
        end;

UNTIL(p=n);
end;
Procedure TGTRLN(a,x:mt1;n:integer);
begin
k:=0;
REPEAT
     k:=k+1;
     for i:=1 to n do
       begin
        B[i,k]:=0;
        for p:=1 to n do
        B[i,k]:=B[i,k]+A[i,p] * X[p,k];
       end;
```

```
        if (X[1,k]<>0) then Y[k]:=B[1,k]/X[1,k];
        for i:=1 to n do
         begin
           if(Y[k]<>0) then
           X[i,k+1]:= B[i,k]/Y[k];
         end;
   UNTIL (abs(Y[k]-Y[k-1])<0.0001);
   for i:=1 to sbt do    VTRN[i]:=X[i,k+1];
        GTRLN:=Y[k];
end;
Begin    clrscr;
(*Nguoi lap trinh :Vo nhu Cau*);
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('toa do x1');
for i:=1 to st do  readln(x1[i]);
writeln('toa do x2');
for i:=1 to st do  readln(x2[i]);
writeln('toa do y1');
for i:=1 to st do  readln(y1[i]);
writeln('toa do y2');
for i:=1 to st do  readln(y2[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap BTD d3');
for i:=1 to st do  readln(d3[i]);
writeln('nhap BTD d4');
for i:=1 to st do  readln(d4[i]);
writeln('nhap ti trong');
readln(tt);

(*Ghep cac MTDC rieng*);
for i:=1 to st do
 begin
    cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(x2[i]-x1[i]));
    l[i]:=(x2[i]-x1[i])/cd[i]; mm[i]:=(y2[i]-y1[i])/cd[i];
```

```
      b1[i]:=sqr(l[i])*e[i]*dt[i]/cd[i];  c1[i]:=l[i]*mm[i]*e[i]*dt[i]/cd[i];
      d[i]:=sqr(mm[i])*e[i]*dt[i]/cd[i];
      s[d1[i],d1[i]]:=s[d1[i],d1[i]]+b1[i];
      s[d1[i],d2[i]]:=s[d1[i],d2[i]]+e1[i];
      s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
      s[d1[i],d3[i]]:=s[d1[i],d3[i]]-b1[i];
      s[d2[i],d3[i]]:=s[d2[i],d3[i]]-e1[i];
      s[d3[i],d3[i]]:=s[d3[i],d3[i]]+b1[i];
      s[d1[i],d4[i]]:=s[d1[i],d4[i]]-e1[i];
      s[d2[i],d4[i]]:=s[d2[i],d4[i]]-d[i];
      s[d3[i],d4[i]]:=s[d3[i],d4[i]]+e1[i];
      s[d4[i],d4[i]]:=s[d4[i],d4[i]]+d[i];
    end;
    for i:=1 to sbt do
    for j:=1 to i-1 do     s[i,j]:=s[j,i];

   (*Ghep cac ma tran khoi luong rieng *);
   for i:=1 to st do
    begin
      c1[i]:=tt*dt[i]*cd[i]/3;     c2[i]:=c1[i]/2;
      m[d1[i],d1[i]]:=m[d1[i],d1[i]]+c1[i];
      m[d1[i],d2[i]]:=m[d1[i],d2[i]]+0;
      m[d2[i],d2[i]]:=m[d2[i],d2[i]]+c1[i];
      m[d1[i],d3[i]]:=m[d1[i],d3[i]]+c2[i];
      m[d2[i],d3[i]]:=m[d2[i],d3[i]]+0;
      m[d3[i],d3[i]]:=m[d3[i],d3[i]]+c1[i];
      m[d1[i],d4[i]]:=m[d1[i],d4[i]]+0;
      m[d2[i],d4[i]]:=m[d2[i],d4[i]]+c2[i];
      m[d3[i],d4[i]]:=m[d3[i],d4[i]]+0;
      m[d4[i],d4[i]]:=m[d4[i],d4[i]]+c1[i];
    end;
   for i:=1 to sbt do
   for j:=1 to i-1 do    m[i,j]:=m[j,i];

   (*Goi chuong trinh con de ngich dao MT m*);
   for i:=1 to sbt do
   for j:=1 to sbt do
   begin
   if(i=j) then u[i,j]:=1;
   if(i<>j) then u[i,j]:=0;
   end;
   NDMT(m,u,sbt);

   (*Xac dinh ma tran a de tinh lap*);
   for i:=1 to sbt do
```

```
for j:=1 to sbt do
begin
  a[i,j]:=0; for k:=1 to sbt do
  a[i,j]:=a[i,j]+u[i,k]*s[k,j];
end;
(*Goi chuong trinh con de tinh gia tri rieng lon nhat*);
for i:=1 to sbt do x[i,1]:=1;
TGTRLN(a,x,sbt);

(*Doc ket qua*);
writeln('vecto rieng n');
for i:=1 to sbt do
writeln(VTRn[i]);
writeln('Gia tri rieng lon nhat');
writeln(GTRLN);
readln;
end.
```

```
Program CTR20_Tinh_gia_tri_rieng_be_nhat_cho_he_gian;
Uses crt;
Type
  mt1= array[1..10,1..10 ] of real ; mt2= array[1..10] of real ;
Var  i,j,k,p,sn,st,sbt,n:integer; d1,d2,d3,d4:array[1..10] of integer;
   c1,c2,b1,e1,d,cd,dt,e,y,vtr1,l,mm,x1,x2,y1,y2:mt2;
   s,m,a,u,b,x:mt1;
   tt,gtrbn,c:real;
Procedure NDMT(var a,u:mt1;n:integer);
 Var    i,j,p :integer;   c:real;
begin
 p:=0;
 REPEAT
       p:=p+1;
       if(a[p,p]<>0)then
       c:=1/a[p,p];
       for j:=1 to n do
          begin
            a[p,j]:=a[p,j]*c;
            U[p,j]:=U[p,j]*c;
          end;
       for i:=1 to n do
       if(i<>p) then
          begin
            c:=a[i,p];
            for j:=1 to n do
             begin
               a[i,j]:=a[i,j]-a[p,j]*c;
               U[i,j]:=U[i,j]-U[p,j]*c;
             end;
          end;

 UNTIL(p=n);
 end;
Procedure TGTRLN(a,x:mt1;n:integer);
 begin
 k:=0;
 REPEAT
      k:=k+1;
      for i:=1 to n do
        begin
          B[i,k]:=0;
          for p:=1 to n do
          B[i,k]:=B[i,k]+A[i,p] * X[p,k];
        end;
```

```
        if (X[1,k]<>0) then Y[k]:=B[1,k]/X[1,k];
        for i:=1 to n do
         begin
          if(Y[k]<>0) then
          X[i,k+1]:= B[i,k]/Y[k];
         end;
   UNTIL (abs(Y[k]-Y[k-1])<0.0001);
   for i:=1 to sbt do   VTR1[i]:=X[i,k+1];
        GTRBN:=1/Y[k];
end;
Begin    clrscr;
(*Nguoi lap trinh :Vo nhu Cau*);
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('toa do x1');
for i:=1 to st do  readln(x1[i]);
writeln('toa do x2');
for i:=1 to st do  readln(x2[i]);
writeln('toa do y1');
for i:=1 to st do  readln(y1[i]);
writeln('toa do y2');
for i:=1 to st do  readln(y2[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap BTD d3');
for i:=1 to st do  readln(d3[i]);
writeln('nhap BTD d4');
for i:=1 to st do  readln(d4[i]);
writeln('nhap ti trong');
readln(tt);

(*Ghep cac MTDC rieng*);
for i:=1 to st do
 begin
    cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(x2[i]-x1[i]));
    l[i]:=(x2[i]-x1[i])/cd[i]; mm[i]:=(y2[i]-y1[i])/cd[i];
```

```
    b1[i]:=sqr(l[i])*e[i]*dt[i]/cd[i];  c1[i]:=l[i]*mm[i]*e[i]*dt[i]/cd[i];
    d[i]:=sqr(mm[i])*e[i]*dt[i]/cd[i];
    s[d1[i],d1[i]]:=s[d1[i],d1[i]]+b1[i];
    s[d1[i],d2[i]]:=s[d1[i],d2[i]]+e1[i];
    s[d2[i],d2[i]]:=s[d2[i],d2[i]]+d[i];
    s[d1[i],d3[i]]:=s[d1[i],d3[i]]-b1[i];
    s[d2[i],d3[i]]:=s[d2[i],d3[i]]-e1[i];
    s[d3[i],d3[i]]:=s[d3[i],d3[i]]+b1[i];
    s[d1[i],d4[i]]:=s[d1[i],d4[i]]-e1[i];
    s[d2[i],d4[i]]:=s[d2[i],d4[i]]-d[i];
    s[d3[i],d4[i]]:=s[d3[i],d4[i]]+e1[i];
    s[d4[i],d4[i]]:=s[d4[i],d4[i]]+d[i];
 end;
 for i:=1 to sbt do
 for j:=1 to i-1 do     s[i,j]:=s[j,i];

(*Ghep cac ma tran khoi luong rieng *);
for i:=1 to st do
 begin
    c1[i]:=tt*dt[i]*cd[i]/3;    c2[i]:=c1[i]/2;
    m[d1[i],d1[i]]:=m[d1[i],d1[i]]+c1[i];
    m[d1[i],d2[i]]:=m[d1[i],d2[i]]+0;
    m[d2[i],d2[i]]:=m[d2[i],d2[i]]+c1[i];
    m[d1[i],d3[i]]:=m[d1[i],d3[i]]+c2[i];
    m[d2[i],d3[i]]:=m[d2[i],d3[i]]+0;
    m[d3[i],d3[i]]:=m[d3[i],d3[i]]+c1[i];
    m[d1[i],d4[i]]:=m[d1[i],d4[i]]+0;
    m[d2[i],d4[i]]:=m[d2[i],d4[i]]+c2[i];
    m[d3[i],d4[i]]:=m[d3[i],d4[i]]+0;
    m[d4[i],d4[i]]:=m[d4[i],d4[i]]+c1[i];
 end;
for i:=1 to sbt do
for j:=1 to i-1 do   m[i,j]:=m[j,i];

(*Goi chuong trinh con de ngich dao MT m*);
for i:=1 to sbt do
for j:=1 to sbt do
begin
if(i=j) then u[i,j]:=1;
if(i<>j) then u[i,j]:=0;
end;
NDMT(m,u,sbt);

(*Xac dinh ma tran a de tinh lap*);
for i:=1 to sbt do
```

```
for j:=1 to sbt do
begin
  a[i,j]:=0; for k:=1 to sbt do
  a[i,j]:=a[i,j]+u[i,k]*s[k,j];
end;

(*Goi chuong trinh con de ngich dao MT a*);
for i:=1 to sbt do
for j:=1 to sbt do
begin
if(i=j) then u[i,j]:=1;
if(i<>j) then u[i,j]:=0;
end;
NDMT(a,u,sbt);

(*Goi chuong trinh con de tinh gia tri rieng be nhat*);
for i:=1 to sbt do x[i,1]:=1;
TGTRLN(u,x,sbt);

(*Doc ket qua*);
writeln('vecto rieng 1');
for i:=1 to sbt do
writeln(VTR1[i]);
writeln('Gia tri rieng be nhat');
writeln(GTRBN);
readln;
end.
```

```
Program CTR21_Tinh_gia_tri_rieng_lon_nhat_cho_he_khung;
Uses crt;
Type
  mt1= array[1..10,1..10 ] of real ; mt2= array[1..10] of real ;
Var  i,j,k,p,sn,st,sbt,n:integer; d1,d2,d3,d4,d5,d6:array[1..10] of integer;
   a1,b1,c1,c2,c3,c4,c5,c6,c7,cd3,mq,g1,g2,g3,g4,cd,dt,e,y,vtrn,l,mm,
   x1,x2,y1,y2:mt2;
   s,m,me,mc,r,a,u,b,t,tc,x:mt1;
   tt,gtrln,c:real;
Procedure NDMT(var a,u:mt1);
 Var    i,j,p :integer;   c:real;
begin
p:=0;
REPEAT
      p:=p+1;
      if(a[p,p]<>0)then
      c:=1/a[p,p];
      for j:=1 to n do
        begin
          a[p,j]:=a[p,j]*c;
          U[p,j]:=U[p,j]*c;
        end;
      for i:=1 to n do
      if(i<>p) then
        begin
          c:=a[i,p];
          for j:=1 to n do
           begin
            a[i,j]:=a[i,j]-a[p,j]*c;
            U[i,j]:=U[i,j]-U[p,j]*c;
           end;
        end;

UNTIL(p=n);
end;
Procedure TGTRLN(a,x:mt1;n:integer);
begin
k:=0;
REPEAT
     k:=k+1;
     for i:=1 to n do
       begin
        B[i,k]:=0;
        for p:=1 to n do
```

```
            B[i,k]:=B[i,k]+A[i,p] * X[p,k];
          end;
        if (X[1,k]<>0) then Y[k]:=B[1,k]/X[1,k];
        for i:=1 to n do
         begin
          if(Y[k]<>0) then
          X[i,k+1]:= B[i,k]/Y[k];
         end;
  UNTIL (abs(Y[k]-Y[k-1])<0.0001);
  for i:=1 to n do    VTRn[i]:=X[i,k+1];
       GTRLN:=Y[k];
end;
Begin    clrscr;
(*Nguoi lap trinh :Vo nhu Cau*);
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('nhap toa do x1');
for i:=1 to st do  readln(x1[i]);
writeln('nhap toa do x2');
for i:=1 to st do  readln(x2[i]);
writeln('nhap toa do y1');
for i:=1 to st do  readln(y1[i]);
writeln('nhap toa do y2');
for i:=1 to st do  readln(y2[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap momen quan tinh');
for i:=1 to st do  readln(mq[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap BTD d3');
for i:=1 to st do  readln(d3[i]);
writeln('nhap BTD d4');
for i:=1 to st do  readln(d4[i]);
writeln('nhap BTD d5');
for i:=1 to st do  readln(d5[i]);
writeln('nhap BTD d6');
for i:=1 to st do  readln(d6[i]);
```

```
writeln('nhap ti trong');
readln(tt);

(*Ghep cac MTDC rieng*);
 for i:=1 to st do
 begin
  cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(y2[i]-y1[i]));
  l[i]:=(x2[i]-x1[i])/cd[i]; mm[i]:=(y2[i]-y1[i])/cd[i];
  cd3[i]:= sqr(cd[i])*cd[i];
  if(((cd3[i]<>0) and (cd[i]<>0)) and (sqr(cd[i])<>0)) then
  begin
  g1[i]:=12*e[i]*mq[i]/cd3[i]; g2[i]:=6*e[i]*mq[i]/sqr(cd[i]);
  g3[i]:=dt[i]*e[i]/cd[i]; g4[i]:=e[i]*mq[i]/cd[i];
  end;
  c1[i]:=g3[i]*sqr(l[i])+g1[i]*sqr(mm[i]);
  c2[i]:=(g3[i]-g1[i])*l[i]*mm[i]; c3[i]:=g3[i]*sqr(mm[i])+g1[i]*sqr(l[i]);
  c4[i]:=g2[i]*mm[i];  c5[i]:=g2[i]*l[i]; c6[i]:=4*g4[i];  c7[i]:=2*g4[i];
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c4[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c5[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c6[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c1[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]-c2[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c4[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c1[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]-c2[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]-c3[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c5[i];
  s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c2[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c3[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c4[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]-c5[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c7[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]-c4[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c5[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c6[i];
 end;
for i:=1 to sbt do
for j:=1 to i-1 do   s[i,j]:=s[j,i];

(*Ghep cac ma tran khoi luong rieng *)
for k:=1 to st do
```

```
begin
  for i:=1 to sbt do
  for j:=1 to sbt do
  begin t[1,1]:=l[k]; t[1,2]:=mm[k]; t[2,1]:=-mm[k]; t[2,2]:=l[k];
  t[4,4]:=l[k]; t[4,5]:=mm[k]; t[5,4]:=-mm[k]; t[5,5]:=l[k]; t[6,6]:=1;
  end;
  a1[k]:=tt*dt[k]*cd[k]/6;    b1[k]:=tt*dt[k]*cd[k]/420;
  for i:=1 to sbt do
  for j:=i to sbt do
  begin me[1,1]:=2*a1[k]; me[1,4]:=a1[k]; me[1,1]:=2*a1[k];
        me[2,2]:=156*b1[k]; me[2,3]:=22*cd[k]*b1[k]; me[2,5]:=54*b1[k];
        me[2,6]:=-13*cd[k]*b1[k];   me[3,3]:=4*sqr(cd[k])*b1[k];
        me[3,5]:=13*cd[k]*b1[k]; me[3,6]:=-3*sqr(cd[k])*b1[k];
        me[4,4]:=2*a1[k]; me[5,5]:=156*b1[k]; me[5,6]:=-22*cd[k]*b1[k];
        me[6,6]:=4*sqr(cd[k])*b1[k];
   end;
        for i:=1 to sbt do
        for j:=1 to i-1 do      me[i,j]:=me[j,i];
        for i:=1 to sbt do
        for j:=1 to sbt do      tc[i,j]:=t[j,i];
        for i:=1 to sbt do
        for j:=1 to sbt do
        begin
        r[i,j]:=0; for p:=1 to sbt do r[i,j]:=r[i,j]+tc[i,p]*me[p,j];
        end;
        for i:=1 to sbt do
        for j:=1 to sbt do
        begin
        mc[i,j]:=0; for p:=1 to sbt do mc[i,j]:=mc[i,j]+r[i,p]*t[p,j];
        end;
    m[d1[i],d1[i]]:=s[d1[i],d1[i]]+mc[1,1];
    m[d1[i],d2[i]]:=m[d1[i],d2[i]]+mc[1,2];
    m[d2[i],d2[i]]:=m[d2[i],d2[i]]+mc[2,2];
    m[d1[i],d3[i]]:=m[d1[i],d3[i]]+mc[1,3];
    m[d2[i],d3[i]]:=m[d2[i],d3[i]]+mc[2,3];
    m[d3[i],d3[i]]:=m[d3[i],d3[i]]+mc[3,3];
    m[d1[i],d4[i]]:=m[d1[i],d4[i]]+mc[1,4];
    m[d2[i],d4[i]]:=m[d2[i],d4[i]]+mc[2,4];
    m[d3[i],d4[i]]:=m[d3[i],d4[i]]+mc[3,4];
    m[d4[i],d4[i]]:=m[d4[i],d4[i]]+mc[4,4];
    m[d1[i],d5[i]]:=m[d1[i],d5[i]]+mc[1,5];
    m[d2[i],d5[i]]:=m[d2[i],d5[i]]+mc[2,5];
    m[d3[i],d5[i]]:=m[d3[i],d5[i]]+mc[3,5];
    m[d4[i],d5[i]]:=m[d4[i],d5[i]]+mc[4,5];
```

```
    m[d5[i],d5[i]]:=m[d5[i],d5[i]]+mc[5,5];
    m[d1[i],d6[i]]:=m[d1[i],d6[i]]+mc[1,6];
    m[d2[i],d6[i]]:=m[d2[i],d6[i]]+mc[1,1];
    m[d3[i],d6[i]]:=m[d3[i],d6[i]]+mc[1,1];
    m[d4[i],d6[i]]:=m[d4[i],d6[i]]+mc[1,1];
    m[d5[i],d6[i]]:=m[d5[i],d6[i]]+mc[1,1];
    m[d6[i],d6[i]]:=m[d6[i],d6[i]]+mc[6,6];
  end;
    for i:=1 to sbt do
    for j:=1 to i-1 do    m[i,j]:=m[j,i];

  (*Nghich dao MT khoi luong*);
    for i:=1 to sbt do
    for j:=1 to sbt do
    begin
    if (i<>j) then u[i,j]:=0;
    if(i=j) then u[i,j]:=1;
    end;
  NDMT(m,u);
  (*Xac dunh ma tran a de tinh lap*);
  for i:=1 to sbt do
  for j:=1 to sbt do
  begin
    a[i,j]:=0; for k:=1 to sbt do
    a[i,j]:=a[i,j]+u[i,k]*s[k,j];
  end;

  (*Qua trinh tinh lap de xac dinh gia tri rieng lon nhat va vec to rieng*);
  for i:=1 to sbt do    (X[i,1]):=1;
  TGTRLN(a,x,sbt);

  (*Doc ket qua*);
  writeln('vecto rieng n');
  for i:=1 to sbt do
  writeln(VTRn[i]);
  writeln('gia tri rieng lon nhat');
  writeln(GTRLN);
  readln;
  end.
```

```
Program CTR22_Tinh_gia_tri_rieng_be_nhat_cho_he_khung;
Uses crt;
Type
  mt1= array[1..10,1..10 ] of real ; mt2= array[1..10] of real ;
Var  i,j,k,p,sn,st,sbt,n:integer; d1,d2,d3,d4,d5,d6:array[1..10] of integer;
   a1,b1,c1,c2,c3,c4,c5,c6,c7,cd3,mq,g1,g2,g3,g4,cd,dt,e,y,vtr1,l,mm,
   x1,x2,y1,y2:mt2;
   s,m,me,mc,r,a,u,b,t,tc,x:mt1;
   tt,gtrbn,c:real;
Procedure NDMT(var a,u:mt1;sbt:integer);
var  i,j,p:integer;   c:real;
begin
 p:=0;
 REPEAT
      p:=p+1;
      if(a[p,p]<>0)then
      begin
      c:=1/a[p,p];
      for j:=1 to sbt do
         begin
           a[p,j]:=a[p,j]*c;
           U[p,j]:=U[p,j]*c;
         end;
       for i:=1 to sbt do
       if(i<>p) then
          begin
            c:=a[i,p];
            for j:=1 to sbt do
             begin
               a[i,j]:=a[i,j]-a[p,j]*c;
               U[i,j]:=U[i,j]-U[p,j]*c;
             end;
          end
      end;
 UNTIL(p=sbt);
end;
Procedure TGTRLN(a,x:mt1;n:integer);
 begin
 k:=0;
 REPEAT
      k:=k+1;
      for i:=1 to n do
        begin
          B[i,k]:=0;
          for p:=1 to n do
```

```
            B[i,k]:=B[i,k]+A[i,p] * X[p,k];
          end;
        if (X[1,k]<>0) then Y[k]:=B[1,k]/X[1,k];
        for i:=1 to n do
         begin
          if(Y[k]<>0) then
          X[i,k+1]:= B[i,k]/Y[k];
         end;
   UNTIL (abs(Y[k]-Y[k-1])<0.0001);
   for i:=1 to n do   VTR1[i]:=X[i,k+1];
       GTRBN:=1/Y[k];
end;
Begin    clrscr;
(*Nguoi lap trinh :Vo nhu Cau*);
 for i:=1 to sbt do
 for j:=1 to sbt do
  begin
  if (i<>j) then u[i,j]:=0;
  if(i=j) then u[i,j]:=1;
  end;
writeln('nhap so thanh');
readln(st);
writeln('nhap so BTD co chuyen vi');
readln(sbt);
writeln('nhap toa do x1');
for i:=1 to st do  readln(x1[i]);
writeln('nhap toa do x2');
for i:=1 to st do  readln(x2[i]);
writeln('nhap toa do y1');
for i:=1 to st do  readln(y1[i]);
writeln('nhap toa do y2');
for i:=1 to st do  readln(y2[i]);
writeln('nhap dien tich');
for i:=1 to st do  readln(dt[i]);
writeln('nhap modun dan hoi');
for i:=1 to st do  readln(e[i]);
writeln('nhap momen quan tinh');
for i:=1 to st do  readln(mq[i]);
writeln('nhap BTD d1');
for i:=1 to st do  readln(d1[i]);
writeln('nhap BTD d2');
for i:=1 to st do  readln(d2[i]);
writeln('nhap BTD d3');
for i:=1 to st do  readln(d3[i]);
writeln('nhap BTD d4');
```

```
for i:=1 to st do  readln(d4[i]);
writeln('nhap BTD d5');
for i:=1 to st do  readln(d5[i]);
writeln('nhap BTD d6');
for i:=1 to st do  readln(d6[i]);
writeln('nhap ti trong');
readln(tt);

(*Ghep cac MTDC rieng*);
 for i:=1 to st do
 begin
  cd[i]:=sqrt(sqr(x2[i]-x1[i])+sqr(y2[i]-y1[i]));
  l[i]:=(x2[i]-x1[i])/cd[i]; mm[i]:=(y2[i]-y1[i])/cd[i];
  cd3[i]:= sqr(cd[i])*cd[i];
  if(((cd3[i]<>0) and (cd[i]<>0)) and (sqr(cd[i])<>0)) then
  begin
  g1[i]:=12*e[i]*mq[i]/cd3[i]; g2[i]:=6*e[i]*mq[i]/sqr(cd[i]);
  g3[i]:=dt[i]*e[i]/cd[i]; g4[i]:=e[i]*mq[i]/cd[i];
  end;
  c1[i]:=g3[i]*sqr(l[i])+g1[i]*sqr(mm[i]);
  c2[i]:=(g3[i]-g1[i])*l[i]*mm[i]; c3[i]:=g3[i]*sqr(mm[i])+g1[i]*sqr(l[i]);
  c4[i]:=g2[i]*mm[i];  c5[i]:=g2[i]*l[i]; c6[i]:=4*g4[i];  c7[i]:=2*g4[i];
  s[d1[i],d1[i]]:=s[d1[i],d1[i]]+c1[i];
  s[d1[i],d2[i]]:=s[d1[i],d2[i]]+c2[i];
  s[d2[i],d2[i]]:=s[d2[i],d2[i]]+c3[i];
  s[d1[i],d3[i]]:=s[d1[i],d3[i]]+c4[i];
  s[d2[i],d3[i]]:=s[d2[i],d3[i]]-c5[i];
  s[d3[i],d3[i]]:=s[d3[i],d3[i]]+c6[i];
  s[d1[i],d4[i]]:=s[d1[i],d4[i]]-c1[i];
  s[d2[i],d4[i]]:=s[d2[i],d4[i]]-c2[i];
  s[d3[i],d4[i]]:=s[d3[i],d4[i]]-c4[i];
  s[d4[i],d4[i]]:=s[d4[i],d4[i]]+c1[i];
  s[d1[i],d5[i]]:=s[d1[i],d5[i]]-c2[i];
  s[d2[i],d5[i]]:=s[d2[i],d5[i]]-c3[i];
  s[d3[i],d5[i]]:=s[d3[i],d5[i]]+c5[i];
  s[d4[i],d5[i]]:= s[d4[i],d5[i]]+c2[i];
  s[d5[i],d5[i]]:=s[d5[i],d5[i]]+c3[i];
  s[d1[i],d6[i]]:=s[d1[i],d6[i]]+c4[i];
  s[d2[i],d6[i]]:=s[d2[i],d6[i]]-c5[i];
  s[d3[i],d6[i]]:=s[d3[i],d6[i]]+c7[i];
  s[d4[i],d6[i]]:=s[d4[i],d6[i]]-c4[i];
  s[d5[i],d6[i]]:=s[d5[i],d6[i]]+c5[i];
  s[d6[i],d6[i]]:=s[d6[i],d6[i]]+c6[i];
 end;
 for i:=1 to sbt do
```

```
 for j:=1 to i-1 do   s[i,j]:=s[j,i];

(*Ghep cac ma tran khoi luong rieng *)
for k:=1 to st do
begin
  for i:=1 to sbt do
  for j:=1 to sbt do
  begin  t[1,1]:=l[k];  t[1,2]:=mm[k]; t[2,1]:=-mm[k];  t[2,2]:=l[k];
  t[4,4]:=l[k]; t[4,5]:=mm[k]; t[5,4]:=-mm[k]; t[5,5]:=l[k];  t[6,6]:=1;
  end;
  a1[k]:=tt*dt[k]*cd[k]/6;     b1[k]:=tt*dt[k]*cd[k]/420;
  for i:=1 to sbt do
  for j:=i to sbt do
  begin  me[1,1]:=2*a1[k];  me[1,4]:=a1[k];  me[1,1]:=2*a1[k];
       me[2,2]:=156*b1[k]; me[2,3]:=22*cd[k]*b1[k];   me[2,5]:=54*b1[k];
       me[2,6]:=-13*cd[k]*b1[k];    me[3,3]:=4*sqr(cd[k])*b1[k];
       me[3,5]:=13*cd[k]*b1[k];  me[3,6]:=-3*sqr(cd[k])*b1[k];
       me[4,4]:=2*a1[k]; me[5,5]:=156*b1[k]; me[5,6]:=-22*cd[k]*b1[k];
       me[6,6]:=4*sqr(cd[k])*b1[k];
 end;
     for i:=1 to sbt do
     for j:=1 to i-1 do      me[i,j]:=me[j,i];
     for i:=1 to sbt do
     for j:=1 to sbt do      tc[i,j]:=t[j,i];
     for i:=1 to sbt do
     for j:=1 to sbt do
     begin
     r[i,j]:=0;  for p:=1 to sbt do  r[i,j]:=r[i,j]+tc[i,p]*me[p,j];
     end;
     for i:=1 to sbt do
     for j:=1 to sbt do
     begin
     mc[i,j]:=0;  for p:=1 to sbt do  mc[i,j]:=mc[i,j]+r[i,p]*t[p,j];
     end;
m[d1[i],d1[i]]:=m[d1[i],d1[i]]+mc[1,1];
m[d1[i],d2[i]]:=m[d1[i],d2[i]]+mc[1,2];
m[d2[i],d2[i]]:=m[d2[i],d2[i]]+mc[2,2];
m[d1[i],d3[i]]:=m[d1[i],d3[i]]+mc[1,3];
m[d2[i],d3[i]]:=m[d2[i],d3[i]]+mc[2,3];
m[d3[i],d3[i]]:=m[d3[i],d3[i]]+mc[3,3];
m[d1[i],d4[i]]:=m[d1[i],d4[i]]+mc[1,4];
m[d2[i],d4[i]]:=m[d2[i],d4[i]]+mc[2,4];
m[d3[i],d4[i]]:=m[d3[i],d4[i]]+mc[3,4];
m[d4[i],d4[i]]:=m[d4[i],d4[i]]+mc[4,4];
m[d1[i],d5[i]]:=m[d1[i],d5[i]]+mc[1,5];
```

```
  m[d2[i],d5[i]]:=m[d2[i],d5[i]]+mc[2,5];
  m[d3[i],d5[i]]:=m[d3[i],d5[i]]+mc[3,5];
  m[d4[i],d5[i]]:=m[d4[i],d5[i]]+mc[4,5];
  m[d5[i],d5[i]]:=m[d5[i],d5[i]]+mc[5,5];
  m[d1[i],d6[i]]:=m[d1[i],d6[i]]+mc[1,6];
  m[d2[i],d6[i]]:=m[d2[i],d6[i]]+mc[1,1];
  m[d3[i],d6[i]]:=m[d3[i],d6[i]]+mc[1,1];
  m[d4[i],d6[i]]:=m[d4[i],d6[i]]+mc[1,1];
  m[d5[i],d6[i]]:=m[d5[i],d6[i]]+mc[1,1];
  m[d6[i],d6[i]]:=m[d6[i],d6[i]]+mc[6,6];
end;
  for i:=1 to sbt do
  for j:=1 to i-1 do    m[i,j]:=m[j,i];

NDMT(m,u,sbt);

(*Tich MT mghich dao M va MTDC tong the*);
for i:=1 to sbt do
for j:=1 to sbt do
begin
  a[i,j]:=0; for k:=1 to sbt do
  a[i,j]:=a[i,j]+u[i,k]*s[k,j];
end;

(*Goi chuong trinh con ngich dao MT a*);
for i:=1 to sbt do
for j:=1 to sbt do
begin
if(i=j) then u[i,j]:=1;  if(i<>j) then u[i,j]:=0;
end;
NDMT(a,u,sbt);

(*Qua trinh tinh lap de xac dinh gia tri rieng be nhat *);
  for i:=1 to sbt do    (X[i,1]):=1;
  TGTRLN(u,x,sbt);

(*Doc ket qua*);
writeln('vecto rieng');
for i:=1 to sbt do
writeln(VTR1[i]);
writeln('Gia tri rieng be nhat');
writeln(GTRBN);
readln;
end.
```