```
> restart;
>  Digits:=20:

   xi[1]:='xi[1]':xi[2]:='xi[2]':xi[3]:='xi[3]':

   xi[3]:=1-xi[1]-xi[2]:


  phi[1,1]:=xi[1]+xi[1]^2*xi[2]+xi[1]^2*xi[3]-xi[1]*xi[2]^2-xi[1]*
  xi[3]^2:


  phi[2,1]:=xi[2]+xi[2]^2*xi[3]+xi[2]^2*xi[1]-xi[2]*xi[3]^2-xi[2]*
  xi[1]^2:


  phi[3,1]:=xi[3]+xi[3]^2*xi[1]+xi[3]^2*xi[2]-xi[3]*xi[1]^2-xi[3]*
  xi[2]^2:


  phi[1,2]:=b3*(xi[1]^2*xi[2]+1/2*xi[1]*xi[2]*xi[3])-b2*(xi[3]*xi[
  1]^2+1/2*xi[1]*xi[2]*xi[3]):


  phi[2,2]:=b1*(xi[2]^2*xi[3]+1/2*xi[2]*xi[3]*xi[1])-b3*(xi[1]*xi[
  2]^2+1/2*xi[2]*xi[3]*xi[1]):


  phi[3,2]:=b2*(xi[3]^2*xi[1]+1/2*xi[3]*xi[1]*xi[2])-b1*(xi[2]*xi[
  3]^2+1/2*xi[3]*xi[1]*xi[2]):


  phi[1,3]:=c3*(xi[1]^2*xi[2]+1/2*xi[1]*xi[2]*xi[3])-c2*(xi[3]*xi[
  1]^2+1/2*xi[1]*xi[2]*xi[3]):


  phi[2,3]:=c1*(xi[2]^2*xi[3]+1/2*xi[1]*xi[2]*xi[3])-c3*(xi[1]*xi[
  2]^2+1/2*xi[1]*xi[2]*xi[3]):


  phi[3,3]:=c2*(xi[3]^2*xi[1]+1/2*xi[1]*xi[2]*xi[3])-c1*(xi[2]*xi[
  3]^2+1/2*xi[1]*xi[2]*xi[3]):


  dxx[1]:=1/4/Delta^2*(b1^2*diff(phi[1,1],xi[1],xi[1])+2*b1*b2*dif
  f(phi[1,1],xi[1],xi[2])+b2^2*diff(phi[1,1],xi[2],xi[2])):
```

```
dxx[4]:=1/4/Delta^2*(b1^2*diff(phi[2,1],xi[1],xi[1])+2*b1*b2*dif
f(phi[2,1],xi[1],xi[2])+b2^2*diff(phi[2,1],xi[2],xi[2])):

dxx[7]:=1/4/Delta^2*(b1^2*diff(phi[3,1],xi[1],xi[1])+2*b1*b2*dif
f(phi[3,1],xi[1],xi[2])+b2^2*diff(phi[3,1],xi[2],xi[2])):

dxx[2]:=1/4/Delta^2*(b1^2*diff(phi[1,2],xi[1],xi[1])+2*b1*b2*dif
f(phi[1,2],xi[1],xi[2])+b2^2*diff(phi[1,2],xi[2],xi[2])):

dxx[5]:=1/4/Delta^2*(b1^2*diff(phi[2,2],xi[1],xi[1])+2*b1*b2*dif
f(phi[2,2],xi[1],xi[2])+b2^2*diff(phi[2,2],xi[2],xi[2])):

dxx[8]:=1/4/Delta^2*(b1^2*diff(phi[3,2],xi[1],xi[1])+2*b1*b2*dif
f(phi[3,2],xi[1],xi[2])+b2^2*diff(phi[3,2],xi[2],xi[2])):

dxx[3]:=1/4/Delta^2*(b1^2*diff(phi[1,3],xi[1],xi[1])+2*b1*b2*dif
f(phi[1,3],xi[1],xi[2])+b2^2*diff(phi[1,3],xi[2],xi[2])):

dxx[6]:=1/4/Delta^2*(b1^2*diff(phi[2,3],xi[1],xi[1])+2*b1*b2*dif
f(phi[2,3],xi[1],xi[2])+b2^2*diff(phi[2,3],xi[2],xi[2])):

dxx[9]:=1/4/Delta^2*(b1^2*diff(phi[3,3],xi[1],xi[1])+2*b1*b2*dif
f(phi[3,3],xi[1],xi[2])+b2^2*diff(phi[3,3],xi[2],xi[2])):

dyy[1]:=1/4/Delta^2*(c1^2*diff(phi[1,1],xi[1],xi[1])+2*c1*c2*dif
f(phi[1,1],xi[1],xi[2])+c2^2*diff(phi[1,1],xi[2],xi[2])):

dyy[4]:=1/4/Delta^2*(c1^2*diff(phi[2,1],xi[1],xi[1])+2*c1*c2*dif
f(phi[2,1],xi[1],xi[2])+c2^2*diff(phi[2,1],xi[2],xi[2])):

dyy[7]:=1/4/Delta^2*(c1^2*diff(phi[3,1],xi[1],xi[1])+2*c1*c2*dif
f(phi[3,1],xi[1],xi[2])+c2^2*diff(phi[3,1],xi[2],xi[2])):

dyy[2]:=1/4/Delta^2*(c1^2*diff(phi[1,2],xi[1],xi[1])+2*c1*c2*dif
f(phi[1,2],xi[1],xi[2])+c2^2*diff(phi[1,2],xi[2],xi[2])):
```

```
dyy[5]:=1/4/Delta^2*(c1^2*diff(phi[2,2],xi[1],xi[1])+2*c1*c2*dif
f(phi[2,2],xi[1],xi[2])+c2^2*diff(phi[2,2],xi[2],xi[2])):


dyy[8]:=1/4/Delta^2*(c1^2*diff(phi[3,2],xi[1],xi[1])+2*c1*c2*dif
f(phi[3,2],xi[1],xi[2])+c2^2*diff(phi[3,2],xi[2],xi[2])):


dyy[3]:=1/4/Delta^2*(c1^2*diff(phi[1,3],xi[1],xi[1])+2*c1*c2*dif
f(phi[1,3],xi[1],xi[2])+c2^2*diff(phi[1,3],xi[2],xi[2])):


dyy[6]:=1/4/Delta^2*(c1^2*diff(phi[2,3],xi[1],xi[1])+2*c1*c2*dif
f(phi[2,3],xi[1],xi[2])+c2^2*diff(phi[2,3],xi[2],xi[2])):


dyy[9]:=1/4/Delta^2*(c1^2*diff(phi[3,3],xi[1],xi[1])+2*c1*c2*dif
f(phi[3,3],xi[1],xi[2])+c2^2*diff(phi[3,3],xi[2],xi[2])):


dxy[1]:=1/4/Delta^2*(c1*b1*diff(phi[1,1],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[1,1],xi[1],xi[2])+c2*b2*diff(phi[1,1],xi[2],xi[2]))
:


dxy[4]:=1/4/Delta^2*(c1*b1*diff(phi[2,1],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[2,1],xi[1],xi[2])+c2*b2*diff(phi[2,1],xi[2],xi[2]))
:


dxy[7]:=1/4/Delta^2*(c1*b1*diff(phi[3,1],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[3,1],xi[1],xi[2])+c2*b2*diff(phi[3,1],xi[2],xi[2]))
:


dxy[2]:=1/4/Delta^2*(c1*b1*diff(phi[1,2],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[1,2],xi[1],xi[2])+c2*b2*diff(phi[1,2],xi[2],xi[2]))
:


dxy[5]:=1/4/Delta^2*(c1*b1*diff(phi[2,2],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[2,2],xi[1],xi[2])+c2*b2*diff(phi[2,2],xi[2],xi[2]))
:
```

```
dxy[8]:=1/4/Delta^2*(c1*b1*diff(phi[3,2],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[3,2],xi[1],xi[2])+c2*b2*diff(phi[3,2],xi[2],xi[2]))
:


dxy[3]:=1/4/Delta^2*(c1*b1*diff(phi[1,3],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[1,3],xi[1],xi[2])+c2*b2*diff(phi[1,3],xi[2],xi[2]))
:


dxy[6]:=1/4/Delta^2*(c1*b1*diff(phi[2,3],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[2,3],xi[1],xi[2])+c2*b2*diff(phi[2,3],xi[2],xi[2]))
:


dxy[9]:=1/4/Delta^2*(c1*b1*diff(phi[3,3],xi[1],xi[1])+(b2*c1+c2*
b1)*diff(phi[3,3],xi[1],xi[2])+c2*b2*diff(phi[3,3],xi[2],xi[2]))
:

 dxxint:=vector(9):dyyint:=vector(9):dxyint:=vector(9):


> for K from 1 by 1 while K<=9 do

 dxxint[K]:=dxx[K]:

 dyyint[K]:=dyy[K]:

 dxyint[K]:=dxy[K]:

 od:

 evalm(dxxint):

 evalm(dyyint):

 evalm(dxyint):

 K1:=matrix(9,3):


>  for K from 1 by 1 while K<=9 do

 K1[K,1]:=dxxint[K]:

 K1[K,2]:=dyyint[K]:
```

```
   K1[K,3]:=2*dxyint[K]:

   od:
>  Df:=evalm(matrix([[1,nu,0],[nu,1,0],[0,0,(1-nu)/2]])):


  Matriflex:=matrix(9,9):Matriflex1:=matrix(9,9):Matriflex2:=matri
  x(9,9):Matriflex3:=matrix(9,9):Matriflex4:=matrix(9,9):

  MatriflexR:=matrix(9,9):

   Matriflex:=evalm(K1&*Df&*transpose(K1)):evalm(K1):

   xi[1]:=0.333333333:xi[2]:=0.333333333:xi[3]:=0.333333333:

   for K from 1 by 1 while K<=9 do

   for Kl from 1 by 1 while Kl<=9 do

   Matriflex1[K,Kl]:=simplify(Matriflex[K,Kl]):

   od:

   od:

   xi[1]:=0.6:xi[2]:=0.2:xi[3]:=0.2:

   for K from 1 by 1 while K<=9 do

   for Kl from 1 by 1 while Kl<=9 do

   Matriflex2[K,Kl]:=simplify(Matriflex[K,Kl]):

   od:

   od:

   xi[1]:=0.2:xi[2]:=0.6:xi[3]:=0.2:

   for K from 1 by 1 while K<=9 do

   for Kl from 1 by 1 while Kl<=9 do

   Matriflex3[K,Kl]:=simplify(Matriflex[K,Kl]):

   od:
```

```
    od:
    xi[1]:=0.2:xi[2]:=0.2:xi[3]:=0.6:
    for K from 1 by 1 while K<=9 do
    for Kl from 1 by 1 while Kl<=9 do
    Matriflex4[K,Kl]:=simplify(Matriflex[K,Kl]):
    od:
    od:
    evalm(Matriflex1[1,1]):
    evalm(Matriflex2[1,1]):
    for K from 1 by 1 while K<=9 do
    for Kl from 1 by 1 while Kl<=9 do
    MatriflexR[K,Kl]:=simplify((-
   0.5625*Matriflex1[K,Kl]+0.520833333*(Matriflex2[K,Kl]+Matriflex3
   [K,Kl]+Matriflex4[K,Kl]))*Delta):
    od:
    od:
> 
> evalm(MatriflexR):
> 
   fortran(MatriflexR,precision=double,filename=Matrifle,optimized)
   :


> 
```