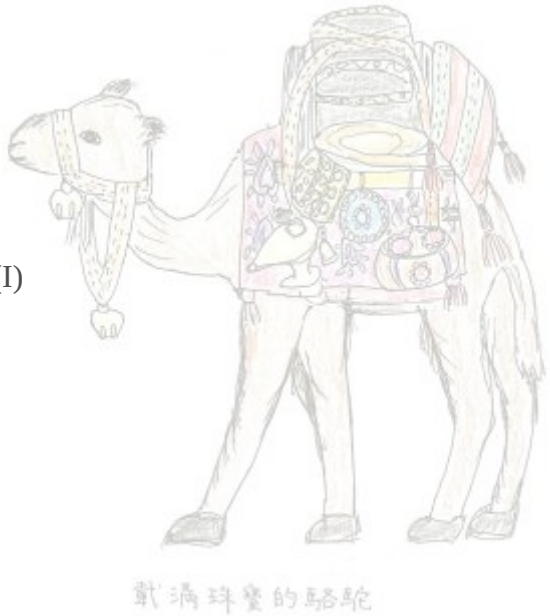
```
      SUBROUTINE VEL_2D(u,W,P,XR,ZR,X,Z,XN,ZN,S,F,FFB,NP,ID)
      REAL X(NP),Z(NP),XN(NP),ZN(NP),F(NP),FFB(NP),S(NP)

      PAI=3.1415927
      C=.57735
      SMAX=S(1)
      DO I=1,NP-ID
      IF(S(I).GT.SMAX) SMAX=S(I)
      END DO

      u=0
      W=0
      P=0
```



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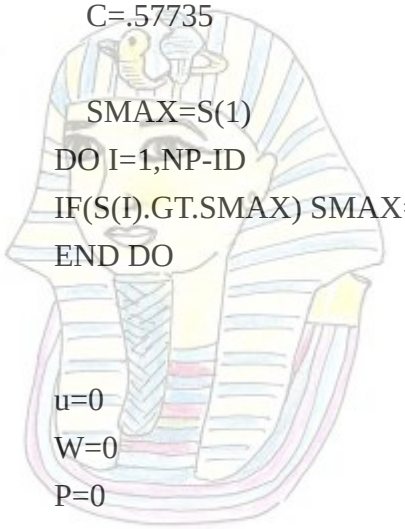
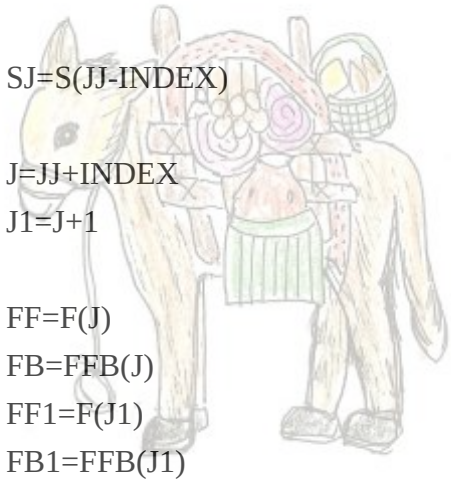


```
      INDEX=0
      DO 201 JJ=1,NP-1
      JJ1=JJ+1
      IF(X(JJ).EQ.X(JJ1).AND.Z(JJ).EQ.Z(JJ+1)) INDEX=INDEX+1
      R=SQRT((X(JJ1)-X(JJ))**2+(Z(JJ+1)-Z(JJ))**2)
      IF(R.GT.SMAX) INDEX=INDEX+1

      SJ=S(JJ-INDEX)

      J=JJ+INDEX
      J1=J+1

      FF=F(J)
      FB=FFB(J)
      FF1=F(J1)
      FB1=FFB(J1)
```



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阿拉丁神燈

```
      XJ=X(J)
      ZJ=Z(J)
      XJJ=X(J1)
      ZJJ=Z(J1)
```

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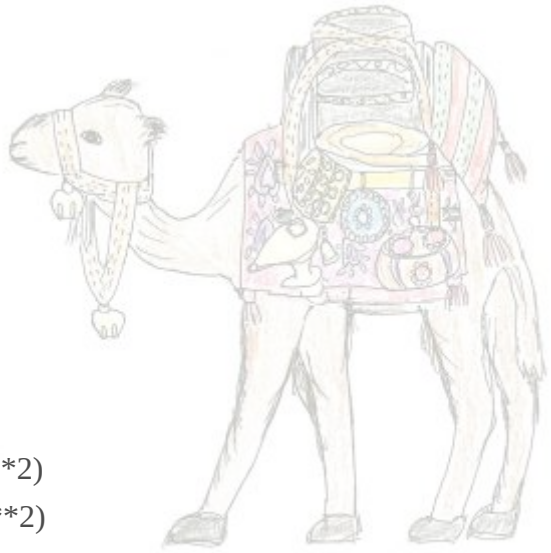
```
X1=(XJJ+XJ)/2
X2=(XJJ-XJ)/2
Z1=(ZJJ+ZJ)/2
Z2=(ZJJ-ZJ)/2
XE1=X1+X2*(-C)
ZE1=Z1+Z2*(-C)
XE2=X1+X2*C
ZE2=Z1+Z2*C
X11=XE1-XR
Z11=ZE1-ZR
X22=XE2-XR
Z22=ZE2-ZR
RM1=SQRT(X11**2+Z11**2)
RM2=SQRT(X22**2+Z22**2)
```



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```
CSF1=X11/RM1
SNF1=Z11/RM1
CSF2=X22/RM2
SNF2=Z22/RM2
```

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```
C11=1+C
C12=1-C
C21=1-C
C22=1+C

E1=C11*2.*CSF1*SNF1/RM1**2+C12*2.*CSF2*SNF2/RM2**2
E2=C21*2.*CSF1*SNF1/RM1**2+C22*2.*CSF2*SNF2/RM2**2

C1X=C11*CSF1/RM1+C12*CSF2/RM2
C2X=C21*CSF1/RM1+C22*CSF2/RM2

D1X=C11*(1/RM1**2-2*(CSF1/RM1)**2)+C12*(1/RM2**2-2*(CSF2/RM2)**2)
D2X=C21*(1/RM1**2-2*(CSF1/RM1)**2)+C22*(1/RM2**2-2*(CSF2/RM2)**2)

U1=FB*C1X+FB1*C2X
U2=FF*XN(J)*D1X+FF1*XN(J1)*D2X
U3=FF*ZN(J)*E1+FF1*ZN(J1)*E2
U=U+(U1-U2+U3)*SJ/8./PAI
```

```
C1Z=C11*SNF1/RM1+C12*SNF2/RM2
C2Z=C21*SNF1/RM1+C22*SNF2/RM2

D1Z=C11*(1/RM1**2-2*(SNF1/RM1)**2)+C12*(1/RM2**2-2*(SNF2/RM2)**2)
D2Z=C21*(1/RM1**2-2*(SNF1/RM1)**2)+C22*(1/RM2**2-2*(SNF2/RM2)**2)

W1=FB*C1Z+FB1*C2Z
W2=FF*ZN(J)*D1Z+FF1*ZN(J1)*D2Z
W3=FF*XN(J)*E1+FF1*XN(J1)*E2
W=W+(W1-W2+W3)*S(JD1)/8./PAI

    A1=Xr*2*Z2-zr*2*X2
    A2=ZJ*2*X2-XJ*2*Z2
    AA=ABS(A1+A2)
    BB=SQRT((2*Z2)**2+(2*X2)**2)
    RRP=AA/BB
    C1=(XJ-XR)*(ZJJ-ZR)
    D1=(XJJ-XR)*(ZJ-ZR)
    IF(C1.LT.D1) RRP=-RRP
    H1=-SJ/8/PAI*(1.57735*RRP/RM1**2+.42265*RRP/RM2**2)
    G1=-SJ/8/PAI*(1.57735*ALOG(RM1)+.42265*ALOG(RM2))
    H2=-SJ/8/PAI*(0.42265*RRP/RM1**2+1.57735*RRP/RM2**2)
    G2=-SJ/8/PAI*(0.42265*ALOG(RM1)+1.57735*ALOG(RM2))
  P=P+G1*FB+G2*FB1-H1*FF-H2*FF1

201 CONTINUE
    return
    end
```

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