

310260/00574A

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10061/1      BEGIN
10061/2      REAL ARRAY U1A,U2A,U1S,U2S,P1,P2[1:40,1:40],DA,U1,U2,U1N,U2N[1:40,1:40],A,C[1:37],D,T[1:38];
10077/1      REAL LA,AL,DT,DX,EPS,MAX,U1ER,U2ER,PER,TH,DFL,B;
10106/3      INTEGER Q,R,N,M,I;
10110/2      PROCEDURE TRID(A,B,C,D,T,K);
10113/3      VALUE B;
10113/6      ARRAY A,C,D,T;
10115/3      INTEGER K;
10115/6      BEGIN
10116/1      ARRAY L[1:37],S[1:38];
10120/6      INTEGER I;
10121/3      L[I]:=C[I]/B;
10123/3      S[I]:=D[I]/B;
10125/3      FOR I:=2 STEP 1 UNTIL K-1 DO
10127/2      BEGIN
10127/3      L[I]:=C[I]/(B-A[I]*L[I-1]);
10133/5      S[I]:=(D[I]-A[I]*S[I-1])/(B-A[I]*L[I-1]);
10142/3
10142/3      END ;
10142/5      S[K]:=(D[K]-A[K]*S[K-1])/(B-A[K]*L[K-1]);
10151/3      T[K]:=S[K];
10153/1      FOR I:=K-1 STEP -1 UNTIL 1 DO
10155/1      T[I]:=S[I]-L[I]*T[I+1];
10160/5

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10160/3      END ;
10161/1      DX:=4*ARTG(1)/39;
10163/5      DT:=DX+2;
10165/1      EPS:=DX+2;
10166/4      LA:=2*DX+2/(DT*SIN(2*DX));
10172/5      AL:=LA*DT/(4*DX+2);
10175/5      TH:=20*DT/(2*DX);
10200/3      DEL:=DT/(DX+2);
10202/5      B:=1+2*DEL;
10204/3      N:=0;
10205/1      FOR Q:=2 STEP 1 UNTIL 39 DO
10206/5          FOR R:=2 STEP 1 UNTIL 39 DO
10210/3              BEGIN
10210/4                  U1[Q,R]:=-COS((Q-1)*DX)*SIN((R-1)*DX);
10216/5                  U2[Q,R]:=SIN((Q-1)*DX)*COS((R-1)*DX);
10224/5
10224/5              END ;
10225/1      NEWN:FOR R:=1 STEP 1 UNTIL 40 DO
10227/4          BEGIN
10227/5              U1[1,R]:=-SIN((R-1)*DX)*EXP(-2*(N)*DT);
10236/1              U1A[1,R]:=-SIN((R-1)*DX)*EXP(-2*(N+1)*DT);
10244/6              U2[1,R]:=0;
10246/4              U2A[1,R]:=0;
10250/3              U1[40,R]:=SIN((R-1)*DX)*EXP(-2*(N)*DT);
10256/5              U1A[40,R]:=SIN((R-1)*DX)*EXP(-2*(N+1)*DT);
10265/4              U2[40,R]:=0;
10267/3              U2A[40,R]:=0;
10271/3
10271/3          END ;
10271/5      FOR Q:=1 STEP 1 UNTIL 40 DO
10273/3          BEGIN
10273/4              U1[Q,1]:=0;
10275/2              U1A[Q,1]:=0;
10277/1              U2[Q,1]:=SIN((Q-1)*DX)*EXP(-2*(N)*DT);
10305/2              U2A[Q,1]:=SIN((Q-1)*DX)*EXP(-2*(N+1)*DT);
10313/6              U1[Q,40]:=0;

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10315/5      U1A10[1,1]:=0;
10317/5      U2[Q,40]:=-SIN((Q-1)*DX)*EXP(-2*(N)*DT);
10326/2      U2A[Q,40]:=-SIN((Q-1)*DX)*EXP(-2*(N+1)*DT);
10335/2
10335/2      END ;
10335/4      FOR Q:=1 STEP 1 UNTIL 40 DO
10337/2      BEGIN
10337/3      U1S[Q,11]:=0;
10341/2      U2S[Q,11]:=SIN((Q-1)*DX)*EXP(-2*(N+1)*DT);
10347/6      U1S[Q,40]:=0;
10351/6      U2S[Q,40]:=-SIN((Q-1)*DX)*EXP(-2*(N+1)*DT);
10360/6
10360/6      END ;
10361/2      FOR R:=1 STEP 1 UNTIL 40 DO
10362/6      BEGIN
10363/1      U1S[1,R]:=-SIN((R-1)*DX)*EXP(-2*(N+1)*DT);
10371/6      U2S[1,R]:=0;
10373/5      U1S[40,R]:=SIN((R-1)*DX)*EXP(-2*(N+1)*DT);
10402/4      U2S[40,R]:=0;
10404/4
10404/4      END ;
10404/6      FOR R:=2 STEP 1 UNTIL 39 DO
10406/4      BEGIN
10406/5      FOR L:=2 STEP 1 UNTIL 37 DO
10410/3      BEGIN
10410/4      A[L]:=-DEL-TH*U1[L+1,R];
10414/3      C[L]:=-DEL+TH*U1[L+1,R];
10420/2      D[L]:=U1[L+1,R];
10422/5
10422/5      END ;
10423/1      C[1]:=-DEL+TH*U1[2,R];
10426/4      D[1]:=U1[2,R]+(TH*U1[2,R+DEL])*U1S[1,R];
10435/1      A[38]:=-TH*U1[39,R]-DEL;
10440/6      D[38]:=U1[39,R]+(DEL-TH*U1[39,R])*U1S[40,R];
10450/1      TRID(A,1+2*DEL,C,D,T,38);
10454/2      FOR L:=1 STEP 1 UNTIL 38 DO

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10455/6      U1S[L+1,R]:=T[L];
10460/4      FOR L:=2 STEP 1 UNTIL 37 DO
10462/2          D[L]:=U2[L+1,R];
10464/5      D[1]:=U2[2,R]+(TH*U1[2,R1+DEL)*U2S[1,R];
10473/2      D[38]:=U2[39,R1+(DEL-TH*U1[39,R1])*U2S[40,R];
10502/3      TRID(A,1+2*DEL,C,D,T,38);
10506/4      FOR L:=1 STEP 1 UNTIL 38 DO
10510/2          U2S[L+1,R]:=T[L];
10512/6
10512/6      END ;
10513/2      FOR Q:=2 STEP 1 UNTIL 39 DO
10514/6          BEGIN
10515/1              FOR L:=2 STEP 1 UNTIL 37 DO
10516/5                  BEGIN
10516/6                      A[L]:=-DEL-TH*U2S[Q,L+1];
10522/6                      C[L]:=-DEL+TH*U2S[Q,L+1];
10526/6                      D[L]:=U1S[Q,L+1];
10531/4
10531/4                      END ;
10531/6                      C[1]:=-DEL+TH*U2S[Q,2];
10535/4                      D[1]:=U1S[Q,2]+(TH*U2S[Q,2]+DEL)*U1A[Q,1];
10544/3                      A[38]:=-TH*U2S[Q,39]-DEL;
10550/3                      D[38]:=U1S[Q,39]+(DEL-TH*U2S[Q,39])*U1A[Q,40];
10557/6                      TRID(A,1+2*DEL,C,D,T,38);
10564/1                      FOR L:=1 STEP 1 UNTIL 38 DO
10565/5                          U1A[Q,L+1]:=T[L];
10570/3                      FOR L:=2 STEP 1 UNTIL 37 DO
10572/1                          D[L]:=U2S[Q,L+1];
10574/5                          D[1]:=U2S[Q,2]+(TH*U2S[Q,2]+DEL)*U2A[Q,1];
10603/4                          D[38]:=U2S[Q,39]+(DEL-TH*U2S[Q,39])*U2A[Q,40];
10613/1                          TRID(A,1+2*DEL,C,D,T,38);
10617/2                          FOR L:=1 STEP 1 UNTIL 38 DO
10620/6                              U2A[Q,L+1]:=T[L];
10623/4
10623/4                          END ;
10623/6          U2A[1,1]:=(2/DX)*(U2A[1,2]-U2A[1,1]-0.25*(U2A[1,3]-U2A[1,1]))+(1/DX)*(U1A[2,1]-U1A[1,1]);

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10642/3      U2A[40,1]:=(1/DX)*(U2A[40,2]-U2A[40,1]-0.25*(U2A[40,3]-U2A[40,1]))+(1/DX)*(U1A[40,1]-U1A[39,1])
10661/6      ;
10662/1      U2A[1,40]:=(1/DX)*(U2A[1,40]-U2A[1,39])+(2/DX)*(U1A[2,40]-U1A[1,40]-0.25*(U1A[3,40]-U1A[1,40]))
10701/4      ;
10701/5      U2A[40,40]:=(1/DX)*(U2A[40,40]-U2A[40,39])+(2/DX)*(U1A[40,40]-U1A[39,40]-0.25*(U1A[40,40]-U1A[
10721/1      38,40])));
10722/4      FOR Q:=2 STEP 1 UNTIL 39 DO
10724/2      BEGIN
10724/3      D2A[Q,1]:=(2/DX)*(U2A[Q,2]-U2A[Q,1]-0.25*(U2A[Q,3]-U2A[Q,1]))+1/(2*DX)*(U1A[Q+1,1]-U1A[Q-1,
10743/2      1]);
10743/6      D2A[Q,40]:=(-2/DX)*(U2A[Q,39]-U2A[Q,40]-0.25*(U2A[Q,38]-U2A[Q,40]))+1/(2*DX)*(U1A[Q+1,40]-
10762/4      U1A[Q-1,40]);
10764/5
10764/5      END ;
10765/1      FOR R:=2 STEP 1 UNTIL 39 DO
10766/5      BEGIN
10766/6      D2A[1,R]:=1/(2*DX)*(U2A[1,R+1]-U2A[1,R-1])+(2/DX)*(U1A[2,R]-U1A[1,R]-0.25*(U1A[3,R]-U1A[1,R]
11005/5      1));
11006/3      D2A[40,R]:=1/(2*DX)*(U2A[40,R+1]-U2A[40,R-1])-(2/DX)*(U1A[39,R]-U1A[40,R]-0.25*(U1A[38,R]-
11025/1      U1A[40,R]));
11027/1
11027/1      END ;
11027/3      FOR Q:=2 STEP 1 UNTIL 39 DO
11031/1      BEGIN
11031/2      D2A[Q,2]:=(1/(2*DX))*(U1A[Q+1,2]-U1A[Q-1,2]+U2A[Q,3]-U2A[Q,1]);
11043/3      D2A[Q,39]:=(1/(2*DX))*(U1A[Q+1,39]-U1A[Q-1,39]+U2A[Q,40]-U2A[Q,38]);
11056/3
11056/3      END ;
11056/5      FOR R:=2 STEP 1 UNTIL 39 DO
11060/3      BEGIN
11060/4      D2A[2,R]:=(1/(2*DX))*(U1A[3,R]-U1A[1,R]+U2A[2,R+1]-U2A[2,R-1]);
11072/5      D2A[39,R]:=(1/(2*DX))*(U1A[40,R]-U1A[38,R]+U2A[39,R+1]-U2A[39,R-1]);
11105/5
11105/5      END ;
11106/1      FOR Q:=3 STEP 1 UNTIL 38 DO
11107/5      FOR R:=3 STEP 1 UNTIL 38 DO

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11111/3      DA[Q,R]:=(1/(2*DX))*(0.1A[Q+1,R]-0.1A[Q-1,R]+0.2A[Q,R+1]-0.2A[Q,R-1]);
11124/2      M:=1;
11124/6      ITER:FOR Q:=1 STEP 1 UNTIL 40 DO
11127/3        FOR R:=1 STEP 1 UNTIL 40 DO
11131/1          IF N=0 AND M=1
11132/3            THEN P1[Q,R]:=-0.25*(COS(2*(Q-1)*DX)+COS(2*(R+1)*DX))
11142/3            ELSE P1[Q,R]:=P2[Q,R];
11145/2      P2[1,1]:=P1[1,1]-LA*DA[1,1];
11151/5      P2[40,1]:=P1[40,1]-LA*DA[40,1];
11156/5      P2[1,40]:=P1[1,40]-LA*DA[1,40];
11163/5      P2[40,40]:=P1[40,40]-LA*DA[40,40];
11171/2      FOR Q:=2 STEP 1 UNTIL 39 DO
11172/6        BEGIN
11173/1          P2[Q,1]:=1/(1+2*AL)*( (1-2*AL)*P1[Q,1]-LA*DA[Q,1]+4*AL*(P1[Q,3]-1/4*(P1[Q,4]-P1[Q,2])));
11211/3          P2[Q,40]:= (1/(1+2*AL))*( (1-2*AL)*P1[Q,40]-LA*DA[Q,40]+4*AL*(P1[Q,38]-0.25*(P1[Q,37]-P1[Q,
11230/1          39))));
11231/2
11231/2      END ;
11231/4      FOR R:=2 STEP 1 UNTIL 39 DO
11233/2        BEGIN
11233/3          P2[1,R]:=1/(1+2*AL)*( (1-2*AL)*P1[1,R]-LA*DA[1,R]+4*AL*(P1[3,R]-1/4*(P1[4,R]-P1[2,R])));
11251/5          P2[40,R]:= (1/(1+2*AL))*( (1-2*AL)*P1[40,R]-LA*DA[40,R]+4*AL*(P1[38,R]-0.25*(P1[37,R]-P1[39,
11270/4          R))));
11271/4
11271/4      END ;
11271/6      P2[2,2]:=1/(1+AL)*( (1-AL)*P1[2,2]-LA*DA[2,2]+AL*(P1[4,2]+P1[2,4]));
11304/6      P2[2,39]:=1/(1+AL)*( (1-AL)*P1[2,39]-LA*DA[2,39]+AL*(P1[4,39]+P1[2,37]));
11320/5      P2[39,2]:=1/(1+AL)*( (1-AL)*P1[39,2]-LA*DA[39,2]+AL*(P1[37,2]+P1[39,4]));
11334/4      P2[39,39]:=1/(1+AL)*( (1-AL)*P1[39,39]-LA*DA[39,39]+AL*(P1[37,39]+P1[39,37]));
11351/2      FOR Q:=3 STEP 1 UNTIL 38 DO
11352/6        BEGIN
11353/1          P2[Q,2]:=1/(1+1.5*AL)*( (1-1.5*AL)*P1[Q,2]-LA*DA[Q,2]+AL*(P1[Q+2,2]+(P1[Q-2,2]+P1[Q,4])));
11371/5          P2[Q,39]:= (1/(1+1.5*AL))*( (1-1.5*AL)*P1[Q,39]-LA*DA[Q,39]+AL*(P1[Q+2,39]+P1[Q-2,39]+P1[Q,
11410/3          37]));
11411/3
11411/3      END ;

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11411/5 FOR R:=3 STEP 1 UNTIL 38 DO
11413/3 BEGIN
11413/4 P2[2,P] := 1/(1+1.5*AL) * ((1-1.5*AL)*P1[2,R] - LA*DA[2,R] + AL*(P1[2,R+2]+P1[2,R-2]+P1[4,R]));
11431/6 P2[39,R] := (1/(1+1.5*AL)) * ((1-1.5*AL)*P1[39,R] - LA*DA[39,R] + AL*(P1[39,R+2]+P1[39,R-2]+P1[37,
11450/5 R]));
11451/4
11451/4 END ;
11451/6 FOR Q:=3 STEP 1 UNTIL 38 DO
11453/4 FOR R:=3 STEP 1 UNTIL 38 DO
11455/2 P2[Q,P] := 1/(1+2*AL) * ((1-2*AL)*P1[Q,R] - LA*DA[Q,R] + AL*(P1[Q+2,R]+P1[Q-2,R]+P1[Q,R+2]+P1[Q,R
11473/6 -2]));
11474/6 MAX := ABS(P2[1,1]-P1[1,1]);
11501/1 FOR Q:=1 STEP 1 UNTIL 40 DO
11502/5 FOR R:=1 STEP 1 UNTIL 40 DO
11504/3 IF MAX < ABS(P2[Q,R]-P1[Q,R])
11510/4 THEN MAX := ABS(P2[Q,R]-P1[Q,R]);
11514/6 IF MAX GE EPS
11516/2 THEN
11516/3 BEGIN
11516/4 M := M+1;
11517/4 GOTO ITER;
11520/4
11520/4 END ;
11520/6 FOR Q:=2 STEP 1 UNTIL 39 DO
11522/4 FOR R:=2 STEP 1 UNTIL 39 DO
11524/2 BEGIN
11524/3 U1N[Q,R] := U1A[Q,R] - DT/(2*DX) * (P1[Q+1,R] - 1/2 * (P2[Q-1,R]+P1[Q-1,R]));
11537/3 U2N[Q,R] := U2A[Q,R] - DT/(2*DX) * (P1[Q,R+1] - 1/2 * (P2[Q,R-1]+P1[Q,R-1]));
11552/3
11552/3 END ;
11552/5 PER := U1ER := U2ER := -1;
11555/4 FOR Q:=2 STEP 1 UNTIL 39 DO
11557/2 FOR R:=2 STEP 1 UNTIL 39 DO
11560/6 BEGIN
11561/1 MAX := ABS(-COS((Q-1)*DX) * SIN((R-1)*DX) * EXP(-2*(N+1)*DT) - U1N[Q,R]);
11573/5 IF U1ER < MAX

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11575/2             U1ER:=MAX;
11576/6      MAX:=ABS(SIN((Q-1)*DX)*COS((R-1)*DX)*EXP(-2*(N+1)*DT)-U2N[Q,R]);
11611/3             IF U2ER<MAX
11612/6                    THEN U2ER:=MAX;
11614/4      MAX:=ABS(-0.25*(COS(2*(Q-1)*DX)+COS(2*(R-1)*DX)*EXP(-4*(N+1)*DT))-P2[Q,R]);
11630/6             IF PER<MAX
11632/2                    THEN PER:=MAX;
11633/5
11633/5             END ;
11634/1      N:=N+1;
11635/1             OUTPUT (N,U1ER,U2ER,PER,M);
11640/4             IF N<20
11641/3                    THEN
11641/4                    BEGIN
11641/5                           FOR Q:=2 STEP 1 UNTIL 39 DO
11643/3                                  FOR R:=2 STEP 1 UNTIL 39 DO
11645/1                                  BEGIN
11645/2                                  U1[Q,R]:=U1N[Q,R];
11650/1                                  U2[Q,R]:=U2N[Q,R];
11652/6
11652/6                    END ;
11653/2                    GOTO NEWN;
11654/2
11654/2             END ;
11654/4
11654/4             END *

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