ソースファイル名：poisson.for，実行ファイル名：poisson.out

```
$ cp    ../common/poisson_ori.for    .
$ cp    poisson_ori.for      poisson.for
$ vi      poisson.for
$ gfortran    -o    poisson.out      poisson.for
$ ./ poisson.out
```

```
      program poisson

      parameter(imax = 30, jmax = 30)
      real*8    p(imax,jmax), pn(imax,jmax), g(imax,jmax)
      real*8    dx, dy, pmax, pmin, norm
      integer i, j, nx, ny
      character a(imax,jmax)

      dx = 1.; dy = 1.; nx = 20; ny = 20

c..   initial condition
      do i = 1, nx; do j = 1, ny
        p(i,j) = 0.
        pn(i,j) = 0.
      enddo; enddo

c..   boundary condition
        do i = 1,nx
          pn(i,1 ) = 0.
          pn(i,ny) = 0.
        end do
        do j = 1,ny
```

```
        end do

c..     pressure
        do n = 1, 1000

          do i = 1, nx; do j = 1, ny
            p(i,j) = pn(i,j)
          end do; end do

          do i = 2, nx-1
```

$$\frac{\partial^2 p}{\partial x^2}+\frac{\partial^2 p}{\partial y^2}=g$$

$$\rightarrow \frac{p_{i+1,j}-2p_{i,j}+p_{i-1,j}}{\Delta x^2}+\frac{p_{i,j+1}-2p_{i,j}+p_{i,j-1}}{\Delta y^2}=g_{i,j}$$

$$\rightarrow p_{i,j}=\frac{p_{i+1,j}\Delta y^2+p_{i-1,j}\Delta y^2+p_{i,j+1}\Delta x^2+p_{i,j-1}\Delta x^2-g_{i,j}\Delta x^2\Delta y^2}{2\left(\Delta x^2+\Delta y^2\right)}$$

```
do j = 2, ny-1
  g(i,j) = -1.
 end do
end do
```

```
do i = 2,nx-1; do j = 2,ny-1
 pn(i,j) = [                                    ]
1          [                                    ]
2          [                                    ]
end do; end do

pmax = 0.; pmin = 100.; norm = 0.
do i = 1, nx; do j = 1, ny
 if(abs(p(i,j)-pn(i,j)) .gt. norm) norm = abs(p(i,j)-pn(i,j))
 if(pn(i,j) .gt. pmax) pmax = pn(i,j)
 if(pn(i,j) .lt. pmin) pmin = pn(i,j)
end do; end do

if(norm    .le. 0.01) go to 100

do i = 1, nx; do j = 1, ny
 p(i,j) = pn(i,j)
end do; end do
```

c.. graphics

```
write(*,*) n , pmax, norm
do i = 1, nx; do j = 1, ny
 if(p(i,j) .le. pmax*1.0                  ) a(i,j)= '9'
 if(p(i,j) .le. pmax*0.9 + pmin*0.1) a(i,j)= '8'
 if(p(i,j) .le. pmax*0.8 + pmin*0.2) a(i,j)= '7'
 if(p(i,j) .le. pmax*0.7 + pmin*0.3) a(i,j)= '6'
 if(p(i,j) .le. pmax*0.6 + pmin*0.4) a(i,j)= '5'
 if(p(i,j) .le. pmax*0.5 + pmin*0.5) a(i,j)= '4'
 if(p(i,j) .le. pmax*0.4 + pmin*0.6) a(i,j)= '3'
 if(p(i,j) .le. pmax*0.3 + pmin*0.7) a(i,j)= '2'
 if(p(i,j) .le. pmax*0.2 + pmin*0.8) a(i,j)= '1'
 if(p(i,j) .le. pmax*0.1 + pmin*0.9) a(i,j)= '0'
end do; end do

do j = ny,1,-1
```

```
          write(*,*) (a(i,j),i = 1,nx)
        end do
        write(*,*) '*------------------------------*'

      enddo

100   write(*,*) n , pmax, norm
      stop

      end
```

《結果》

245　　26.3778969163912　　1.001765911574637Ｅ-003

```
000000000000000000
001111222222222111100
011233334444333211O
012344555555554432l0
013455666776665543l0
013456777887776543l0
023567788888776532O
023567889999887653O
024567899999987654O
024578899999988754O
024578899999988754O
024567899999987654O
023567889999887653O
023567788888776532O
013456777887776543l0
013455666776665543l0
012344555555554432l0
011233334444333211O
001111222222222111100
000000000000000000
*------------------------------*
        158    26.3934117508272        9.683753218112656E-004
```