

演習 1

プログラムをタイプせよ。

R U N して結果を描け。

```
option arithmetic complex
set window -10,10,-10,10

let i=complex(0,1)
let b=0.5
let h=0.001
def f(z)=log(z+3)-log(z-3)

for x=-5 to 5 step 0.6
  for y=-5 to 5 step 0.6
    let z=x+i*y
    let w=f(z)
    let z=x+h+i*y
    let wx=f(z)
    let vy=-((Im(wx)-Im(w))/h)
    let z=x+i*(y+h)
```

```
let wy=f(z)
let vx=(Im(wy)-Im(w))/h
let theta=angle(vx,vy)
let L=sqr(vx^2+vy^2)
if (x+3)^2+y^2>1 and (x-3)^2+y^2>1 then
  draw arrow with rotate(theta)*scale(0.7*L)*shift(x,y)
end if

next y
next x
draw circle with scale (a)
END
!-----
external picture arrow
OPTION ARITHMETIC COMPLEX
let aa=30*pi/180
plot 0,0;1,0
plot 1,0;1-0.3*cos(aa),0.3*sin(aa)
plot 1,0;1-0.3*cos(aa),-0.3*sin(aa)
end picture
```

```
option arithmetic complex
set window -10,10,-10,10
let i=complex(0,1)
let a=2
let U=1
let G=1*pi*a
set line width 3
for x=-5 to 5 step 0.03
  for y=-5 to 5 step 0.03
    let z=x+i*y
    let w=U*(z+a^2/z)+i*G/2/pi*log(z/a)
    let psi=Im(w)
    let pfi=Re(w)

    if x^2+y^2>a^2 then
      for k=-10 to 10 step 1
        if psi>k-0.05 and psi<k+0.05 then
          set line color 1
          plot lines : x,y
        end if
        if pfi>k-0.03 and pfi<k+0.03 then
          set line color 2
          plot lines :x,y
        end if
      next k
    end if
  next y
next x
END
```

演習 2

左のプログラムをタイプせよ。

R U N して結果を下に書け。

```
option arithmetic complex
set window -10,10,-10,10
set axis color 1
draw axes
let i=complex(0,1)
let a=1.5
let b=1.3
let alpha=-6/180*pi
let U=2
let G=2.5*pi*a
let c=-0.1+0.3*i
for x=-5 to 5 step 0.03
  for y=-5 to 5 step 0.03
    let z=x+i*y
    let zz=(z-c)*exp(i*alpha)
    let w=U*(zz+a^2/zz)+i*G/2/pi*log(zz/a)
    let ez=z+b^2/z
    let ex=Re(ez)
    let ey=Im(ez)
    let psi=Im(w)
    if abs(z-c)>a then
      for k=0 to 10 step 1
        if abs(psi)>k and abs(psi)<k+0.06 then
          plot points : ex,ey
        end if
      next k
    end if
  next y
next x
END
```

演習 3

左のプログラムをタイプせよ。
RUNして結果を書け。

