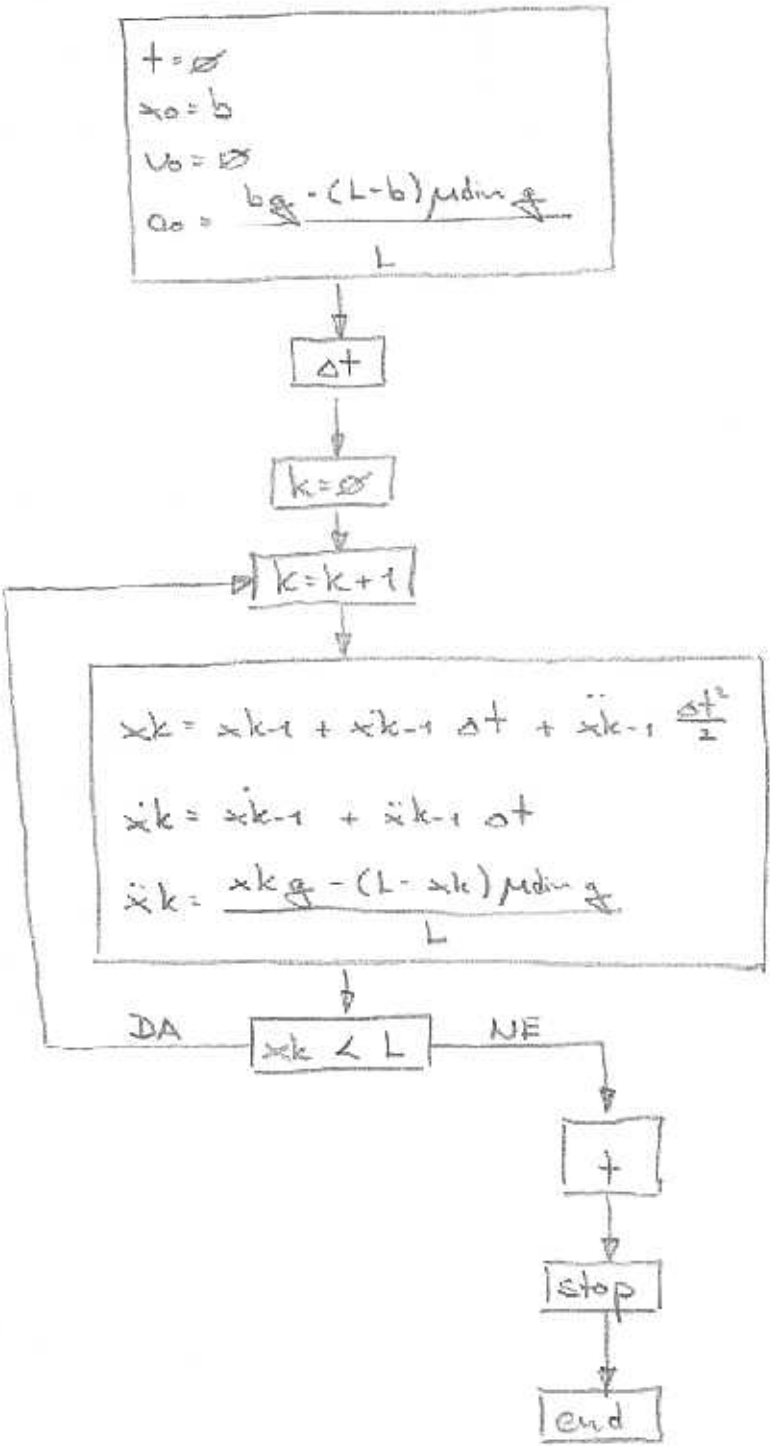
Diagram poteka pri Eulerjevi metodi za reševanje problema z vetrom:



```
write(*,*)'Vnesi začetne podatke  b0 [m], L [m], nd [/]'
read(*,*)x0,L,nd
write(*,*)
write(*,*)'Vnesi robne pogoje t0 [s], v0 [m/s], ter podaj korak casa dt'
read(*,*)t0,dx0,dt
g=10

15  ddx0=(g/L+g/L*nd)*x0-g*nd


    x1=x0+dx0*dt+ddx0*(dt)**2/2
    dx1=dx0+ddx0*dt
    ddx1=(g/L+g/L*nd)*x1-g*nd
    t1=t0+dt

    if(x1<=L)then
    x0=x1
    dx0=dx1
    t0=t1
    go to 15

    else

    write(*,*)'Celotna veriga bo zdrsnila z police v casu',t1,'s'
    t2=0.51
    write(*,*)'Cas zracunan na prejsnjih vajah je',t2,'s'
    endif
end
```

```
!     **********************************
!     *          Rezultati             *
!     *  dt=0,1          t=0.6000000   *
!     *  dt=0,01         t=0.5099998   *
!     *  dt=0,001        t=0.5039971   *
!     *  dt=0,0001       t=0.5030711   *
!     *  dt=0,00001      t=0.5033553   *
!     **********************************
```

Diagram poteka reševanja za zajca in lisico

$t_0 = 0$

$x_{Z0} = 12$

$y_{Z0} = 0$

$x_{L0} = -6$

$y_{L0} = 0$

$$\dot{x}_L(t) = v_L \frac{x_Z(t) - x_L(t)}{\sqrt{(x_Z(t) - x_L(t))^2 + (y_Z(t) - y_L(t))^2}} \approx \frac{\Delta x_L}{\Delta t}$$

$$\dot{y}_L(t) = v_L \frac{y_Z(t) - y_L(t)}{\sqrt{(x_Z(t) - x_L(t))^2 + (y_Z(t) - y_L(t))^2}} \approx \frac{\Delta y_L}{\Delta t}$$

Δt

$k = 0$

$k = k + 1$

$$\Delta x_{L1} = \Delta t v_L \frac{(x_Z(t_0) - x_L(t_0))}{\sqrt{(x_Z(t_0) - x_L(t_0))^2 + (y_Z(t_0) - y_Z(t_0))^2}}$$

$$\Delta y_{L1} = \Delta t v_L \frac{(y_Z(t_0) - y_L(t_0))}{\sqrt{(x_Z(t_0) - x_L(t_0))^2 + (y_Z(t_0) - y_L(t_0))^2}}$$

$$\Delta x_{L2} = \Delta t v_L \frac{x_Z(t_0 + \frac{\Delta t}{2}) - (x_L(t_0) + \Delta x_{L1}/2)}{\sqrt{(x_Z(t_0 + \frac{\Delta t}{2}) - x_L(t_0) - \Delta x_{L1}/2)^2 + (y_Z(t_0 + \frac{\Delta t}{2}) - y_L(t_0) + \Delta y_{L1}/2)^2}}$$

$$\Delta y_{L2} = \Delta t v_L \frac{y_Z(t_0 + \frac{\Delta t}{2}) - (y_L(t_0) + \Delta y_{L1}/2)}{\sqrt{(x_Z(t_0 + \frac{\Delta t}{2}) - x_L(t_0) - \Delta x_{L1}/2)^2 + (y_Z(t_0 + \frac{\Delta t}{2}) - y_L(t_0) + \Delta y_{L1}/2)^2}}$$

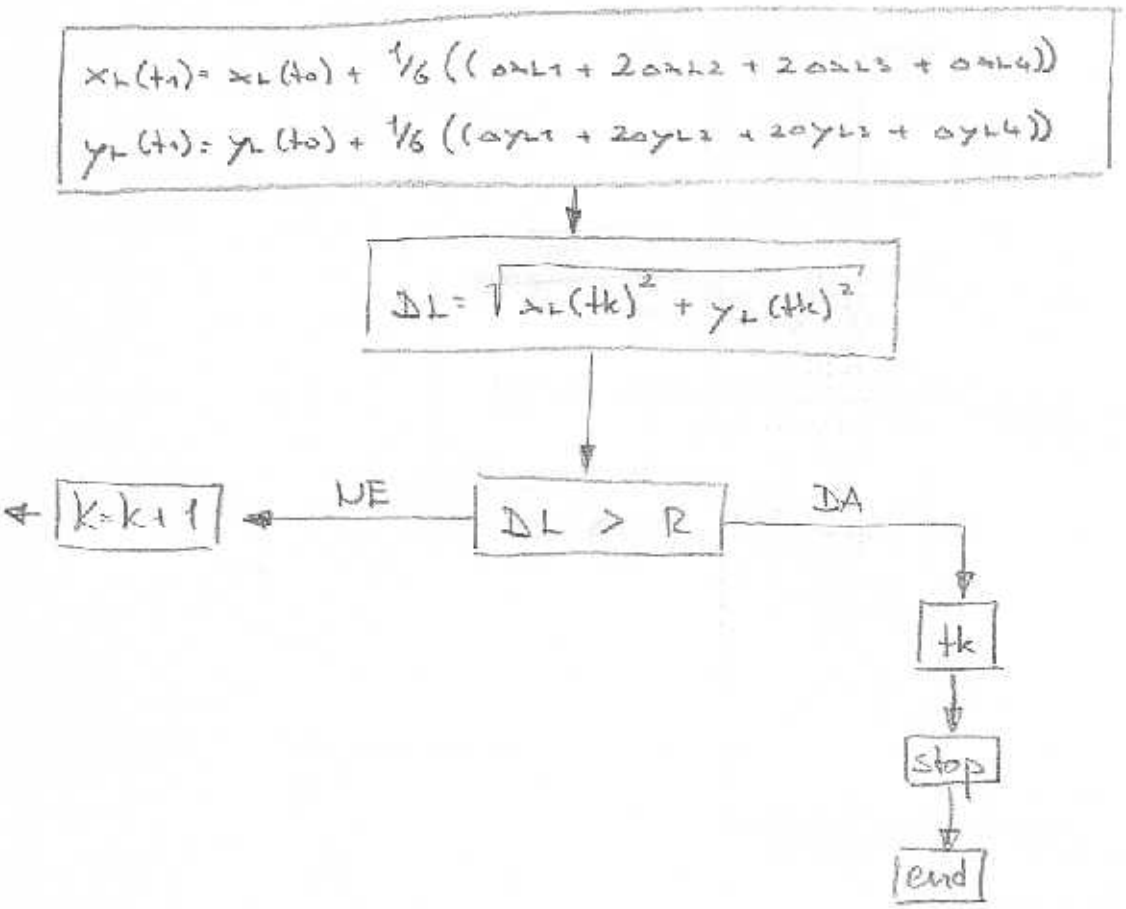
$$\Delta x_{L3} = \Delta t v_L \frac{(x_Z(t_0 + \frac{\Delta t}{2}) - x_L(t_0) - \Delta x_{L2}/2)}{\sqrt{(x_Z(t_0 + \frac{\Delta t}{2}) - x_L(t_0) - \Delta x_{L2}/2)^2 + (y_Z(t_0 + \frac{\Delta t}{2}) - y_L(t_0) - \Delta y_{L2}/2)^2}}$$

$$\Delta y_{L3} = \Delta t v_L \frac{(y_Z(t_0 + \frac{\Delta t}{2}) - y_L(t_0) - \Delta y_{L2}/2)}{\sqrt{(x_Z(t_0 + \frac{\Delta t}{2}) - x_L(t_0) - \Delta x_{L2}/2)^2 + (y_Z(t_0 + \frac{\Delta t}{2}) - y_L(t_0) - \Delta y_{L2}/2)^2}}$$

$$\Delta x_{L4} = \Delta t v_L \frac{(x_Z(t_0 + \Delta t) - x_L(t_0) - \Delta x_{L3})}{\sqrt{(x_Z(t_0 + \Delta t) - x_L(t_0) - \Delta x_{L3})^2 + (y_Z(t_0 + \Delta t) - y_L(t_0) - \Delta y_{L3})^2}}$$

$$\Delta y_{L4} = \Delta t v_L \frac{y_Z(t_0 + \Delta t) - y_L(t_0) - \Delta y_{L3}}{\sqrt{(x_Z(t_0 + \Delta t) - x_L(t_0) - \Delta x_{L3})^2 + (y_Z(t_0 + \Delta t) - y_L(t_0) - \Delta y_{L3})^2}}$$

OBRNI


$x_L(t_1) = x_L(t_0) + \frac{1}{6}((\alpha x_{L1} + 2\alpha x_{L2} + 2\alpha x_{L3} + \alpha x_{L4}))$
$y_L(t_1) = y_L(t_0) + \frac{1}{6}((\alpha y_{L1} + 2\alpha y_{L2} + 2\alpha y_{L3} + \alpha y_{L4}))$
$DL = \sqrt{x_L(tk)^2 + y_L(tk)^2}$
DL > R
NE
DA
K=K+1
tk
stop
end

```
!Rešujemo problem v kolikšnem času lisica ujame zajca

!Program
real::vL,vZ,R,xZ0,yZ0,xL0,yL0,t0,dt,tk,DL,xZ1,yZ1,xL1,yL1
real::dxL1,dyL1,dxL2,dyL2,dxL3,dyL3,dxL4,dyL4

external vLx
external vLy

!Podatki za računaje
R=12    ![m]
vL=7    ![m/s]
vZ=6    ![m/s]
write(*,*)
write(*,*)'Vnesi zacetno lego (x0,y0) za zajca in lisico [m]!'
read(*,')xZ0,yZ0,xL0,yL0
write(*,*)
write(*,*)'Vnesi se zacetni cas t0 in izberi casovni korak dt [s]!'
read(*,*)t0,dt

!Pozicija zajca v odvisnosti od časa

!xZ(t)=R*cos(vZ/R*t)
!yZ(t)=R*sin(vZ/R*t)

12  xZ1=R*cos(vZ/R*tk)
    yZ1=R*sin(vZ/R*tk)
    dxL1=dt*vLx(t0,xL0,yL0)
    dyL1=dt*vLy(t0,xL0,yL0)
    dxL2=dt*vLx(t0+dt/2.,xL0+dxL1,yL0+dyL1)
    dyL2=dt*vLy(t0+dt/2.,xL0+dxL1,yL0+dyL1)
    dxL3=dt*vLx(t0+dt/2.,xL0+dxL2,yL0+dyL3)
    dyL3=dt*vLy(t0+dt/2.,xL0+dxL2,yL0+dyL3)
    dxL4=dt*vLx(t0+dt,xL0+dxL3,yL0+dyL3)
    dyL4=dt*vLy(t0+dt,xL0+dxL3,yL0+dyL3)
    xL1=xL0+1/6.*(dxL1+2.*dxL2+2.*dxL3+dxL4)
    yL1=yL0+1/6.*(dyL1+2.*dyL2+2.*dyL3+dyL4)

    tk=t0+dt

!Izpis xL1,yL1
write(*,*)xL1,yL1
                                  !  ********************************
DL=sqrt(xL1**2.+yL1**2.)          !  *          Rešitev             *
                                  !  *   dt=0,1       tk=6.199996  *
if(DL>=12)then                    !  *   dt=0,01      tk=4.360005  *
  go to 15                        !  *   dt=0,001     tk=4.346868  *
else                              !  *   dt=0,0001    tk=4.338424  *
  t0=tk                           !  *   dt=0,00001   tk=4,367756  *
  xl0=xl1                         !  ********************************
  yl0=yl1
  go to 12
endif

15  write(*,*)'Koordinate zajca so',xZ1,',',yZ1,'.'
    write(*,*)'Koordinate lisice so',xL1,',',yL1,'.'
    write(*,*)'Razdalja lisice od sredisca kroznice je',DL,'m'
    write(*,*)'Lisica ujame zajca v',tk,'s'

end
real function vLy(t,x,y)
R=12
vZ=6
vL=7
!vLy=vL*(yZ(t)-y)/sqrt((xZ(t)-x)**2+((yZ(t)-y)**2)
vLy=vL*(R*sin(vZ/R*t)-y)/sqrt((R*cos(vZ/R*t)-x)**2+(R*sin(vZ/R*t)-y)**2)
end
real function vLx(t,x,y)
R=12
vZ=6
vL=7
!vLx=vL*(xZ(t)-x)/sqrt((xZ(t)-x)**2+((yZ(t)-y)**2)
vLx=vL*(R*cos(vZ/R*t)-x)/sqrt((R*cos(vZ/R*t)-x)**2+(R*sin(vZ/R*t)-y)**2)
end
```