(1)

(a)

> **ec1:=diff(x(t),t)=x(t)+4\*y(t);**



> **ec2:=diff(y(t),t)=x(t)+y(t);**



> **dsolve({ec1,ec2},{x(t),y(t)});**



(b)

> **ec1:=diff(x(t),t)=2\*x(t)-y(t);**



> **ec2:=diff(y(t),t)=x(t)+2\*y(t);**



> **dsolve({ec1,ec2},{x(t),y(t)});**



(c)

> **ec1:=diff(x(t),t)=x(t)-y(t)+z(t);**



> **ec2:=diff(y(t),t)=x(t)+y(t)-z(t);**



> **ec3:=diff(z(t),t)=-y(t)+2\*z(t);**



> dsolve({ec1,ec2,ec3},{x(t),y(t),z(t)});



(d)

> **ec1:=diff(x(t),t)=3\*x(t)-y(t)+z(t);**



> **ec2:=diff(y(t),t)=2\*x(t)+z(t);**



> **ec3:=diff(z(t),t)=x(t)-y(t)+2\*z(t);**



> **dsolve({ec1,ec2,ec3},{x(t),y(t),z(t)});**



(e)

> **ec1:=diff(x(t),t)=5\*x(t)+3\*y(t)+1;**



> **ec2:=diff(y(t),t)=-6\*x(t)-4\*y(t)+exp(t);**



> **dsolve({ec1,ec2},{x(t),y(t)});**



(f)

> **ec1:=diff(x(t),t)=x(t)+3\*y(t)+cos(t);**



> **ec2:=diff(y(t),t)=x(t)-y(t)+2\*t;**



> **dsolve({ec1,ec2},{x(t),y(t)});**



(g)

> **ec1:=diff(x(t),t)=x(t)-2\*y(t)-2\*z(t)+exp(-t);**



> **ec2:=diff(y(t),t)=-2\*x(t)+y(t)+2\*z(t);**



> **ec3:=diff(z(t),t)=2\*x(t)-y(t)-3\*z(t)+exp(t);**



> **dsolve({ec1,ec2,ec3},{x(t),y(t),z(t)});**





(h)

> **ec1:=diff(x(t),t)=-x(t)+3\*y(t)-4\*z(t)+25\*t;**



> **ec2:=diff(y(t),t)=-2\*x(t)-6\*z(t)+12\*exp(t);**



> **ec3:=diff(z(t),t)=-2\*x(t)-6\*y(t)+6\*z(t)+12;**



> **dsolve({ec1,ec2,ec3},{x(t),y(t),z(t)});**





(2)

(a)

> **sist:=diff(x(t),t)=x(t)+4\*y(t),diff(y(t),t)=x(t)+y(t);**



> **cond\_in:=x(0)=1,y(0)=2;**



> **xx1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]], linecolor=blue,**

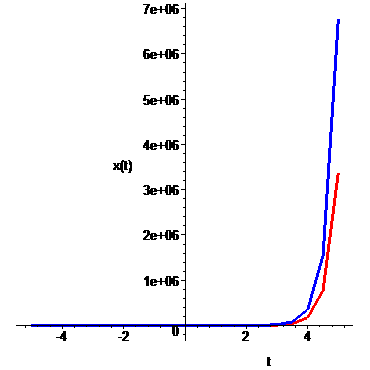
**scene=[t,x(t)]):**

>

**yy1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]],linecolor=red,**

**scene=[t,y(t)]):**

> **display([xx1,yy1]);**



(b)

> **sist:=diff(x(t),t)=x(t)-y(t)+t+1,diff(y(t),t)=-2\*x(t)+4\*y(t)+exp(t);**



> **cond\_in:=x(0)=0,y(0)=1;**



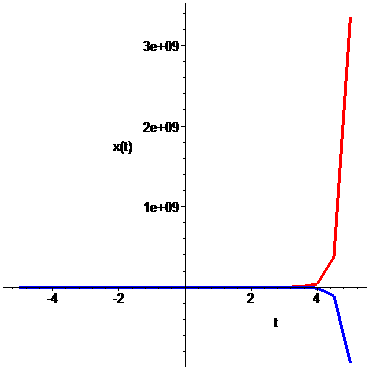
> **xx1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]], linecolor=blue,**

**scene=[t,x(t)]):**

> **yy1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]],linecolor=red,**

**scene=[t,y(t)]):**

> **display([xx1,yy1]);**



(c)

> **sist:=diff(x(t),t)=x(t)+2\*y(t)+exp(-t),diff(y(t),t)=-2\*x(t)+y(t)+1;**



> **cond\_in:=x(0)=0,y(0)=1;**



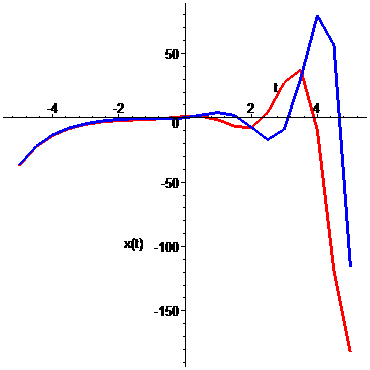
> **xx1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]], linecolor=blue,**

**scene=[t,x(t)]):**

> **yy1:=DEplot([sist],[x,y],t=-5..5,[[cond\_in]],linecolor=red,**

**scene=[t,y(t)]):**

> **display([xx1,yy1]);**



(d)

> **sist:=diff(x(t),t)=-x(t)+3\*y(t)+3\*z(t)+27\*t^2,diff(y(t),t)=2\*x(t)-2\*y(t)-5\*z(t)+3\*t,diff(z(t),t)=-2\*x(t)+3\*y(t)+6\*z(t)+3;**



> **cond\_in:=x(0)=50,y(0)=-30,z(0)=26;**



> **xx1:=DEplot([sist],[x,y,z],t=-5..5,[[cond\_in]], linecolor=blue,**

**scene=[t,x(t)]):**

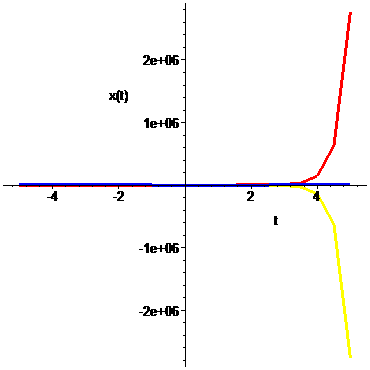
> **yy1:=DEplot([sist],[x,y,z],t=-5..5,[[cond\_in]],linecolor=red,**

**scene=[t,y(t)]):**

> **zz1:=DEplot([sist],[x,y,z],t=-5..5,[[cond\_in]],linecolor=yellow,**

**scene=[t,z(t)]):**

> **display([xx1,yy1,zz1]);**



(3)

(a + b)

> **sist:=diff(x(t),t)=x(t)+y(t),diff(y(t),t)=-2\*x(t)+4\*y(t);**



> **cond\_in:=x(0)=3,y(0)=0;**



> **sol:=dsolve({sist,cond\_in},{x(t),y(t)});**



> **limit(sol[1],t=infinity);**



> **limit(sol[2],t=infinity);**



> **cond\_in:=x(0)=2,y(0)=3;**



> **sol:=dsolve({sist,cond\_in},{x(t),y(t)});**



> **limit(sol[1],t=infinity);**



> **limit(sol[2],t=infinity);**



> **cond\_in:=x(0)=-3,y(0)=0;**



> **sol:=dsolve({sist,cond\_in},{x(t),y(t)});**



> **limit(sol[1],t=infinity);**



> **limit(sol[2],t=infinity);**



> **cond\_in:=x(0)=-2,y(0)=-3;**



> **sol:=dsolve({sist,cond\_in},{x(t),y(t)});**



> **limit(sol[1],t=infinity);**



> **limit(sol[2],t=infinity);**



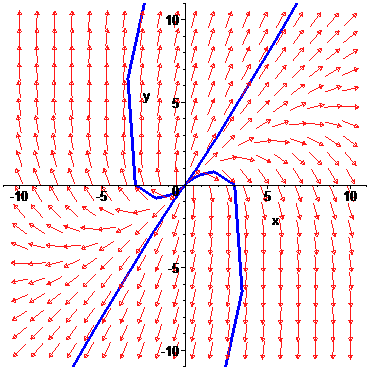
(c)

> **sist:=diff(x(t),t)=x(t)+y(t),diff(y(t),t)=-2\*x(t)+4\*y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



(4)

> **sist:=diff(x(t),t)=y(t),diff(y(t),t)=-x(t)-2\*y(t);**



> **sol:=dsolve({sist},{x(t),y(t)});**



> **limit(sol[1],t=infinity);**

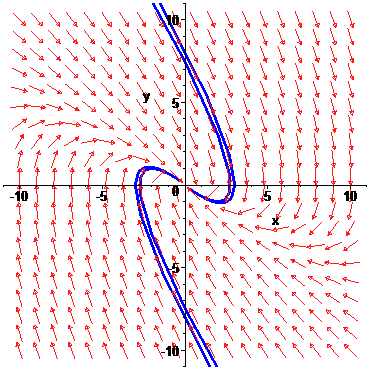


> **limit(sol[2],t=infinity);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



(5)

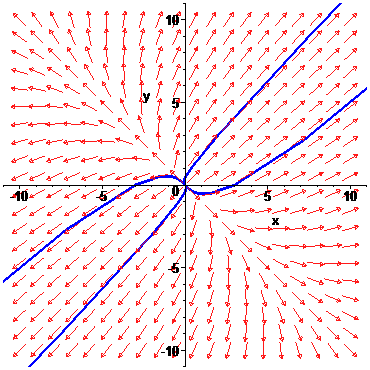
(a)

> **sist:=diff(x(t),t)=2\*x(t)+y(t),diff(y(t),t)=x(t)+2\*y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



Nu are loc.

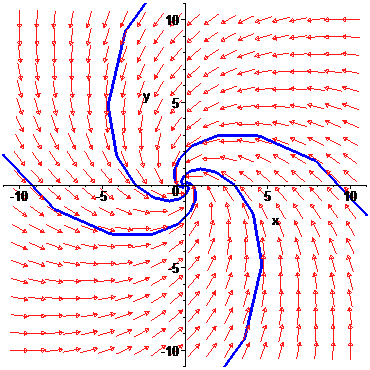
(b)

> **sist:=diff(x(t),t)=-x(t)-y(t),diff(y(t),t)=x(t)-y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



Are loc.

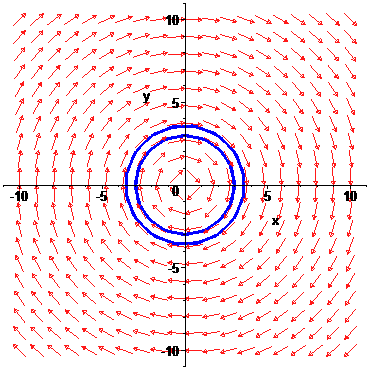
(c)

> **sist:=diff(x(t),t)=y(t),diff(y(t),t)=-x(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



Are loc daca si numai daca x(0)=0 si y(0)=0.

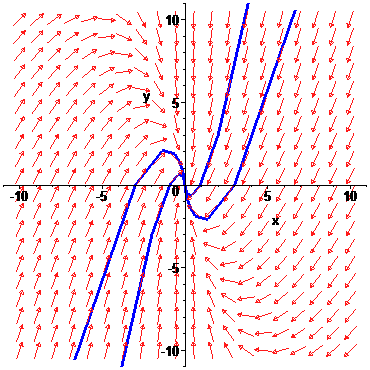
(d)

> **sist:=diff(x(t),t)=-2\*x(t),diff(y(t),t)=-4\*x(t)-2\*y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



Are loc.

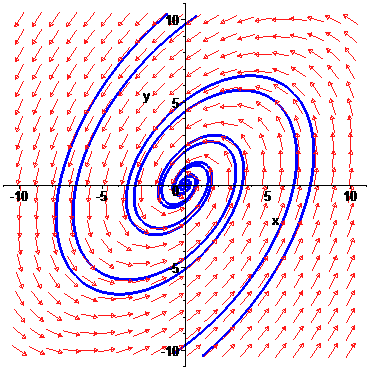
(e)

> **sist:=diff(x(t),t)=x(t)-4\*y(t),diff(y(t),t)=5\*x(t)-3\*y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue,stepsize=1/100);**



Are loc.

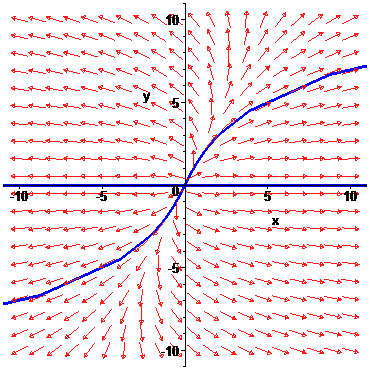
(f)

> **sist:=diff(x(t),t)=3\*x(t)-y(t),diff(y(t),t)=y(t);**



> **DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10,**

**[[x(0)=3,y(0)=0], [x(0)=2,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=-2,y(0)=-3]], arrows=medium, linecolor=blue);**



Nu are loc.