```
> restart;
```

1. a)

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

$$ec1 := \frac{\mathrm{d}}{\mathrm{d}t}\,x(t) = x(t) + 4\,y(t) \tag{1}$$

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

$$ec2 := \frac{\mathrm{d}}{\mathrm{d}t}\,y(t) = x(t) + y(t) \tag{2}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{\mathrm{d}}{\mathrm{d}t}\,x(t) = x(t) + 4\,y(t),\ \frac{\mathrm{d}}{\mathrm{d}t}\,y(t) = x(t) + y(t) \tag{3}$$

```
> with(DEtools)
```

[*AreSimilar, Closure, DEnormal, DEplot, DEplot3d, DEplot_polygon, DFactor, DFactorLCLM, DFactorsols, Dchangevar, Desingularize, FindODE, FunctionDecomposition, GCRD, Gosper, Heunsols, Homomorphisms, IVPsol, IsHyperexponential, LCLM, MeijerGsols, MultiplicativeDecomposition, ODEInvariants, PDEchangecoords, PolynomialNormalForm, RationalCanonicalForm, ReduceHyperexp, RiemannPsols, Xchange, Xcommutator, Xgauge, Zeilberger, abelsol, adjoint, autonomous, bernoullisol, buildsol, buildsym, canoni, caseplot, casesplit, checkrank, chinisol, clairautsol, constcoeffsols, convertAlg, convertsys, dalembertsol, dcoeffs, de2diffop, dfieldplot, diff_table, diffop2de, dperiodic_sols, dpolyform, dsubs, eigenring, endomorphism_charpoly, equinv, eta_k, eulersols, exactsol, expsols, exterior_power, firint, firtest, formal_sol, gen_exp, generate_ic, genhomosol, gensys, hamilton_eqs, hypergeometricsols, hypergeomsols, hyperode, indicialeq, infgen, initialdata, integrate_sols, intfactor, invariants, kovacicsols, leftdivision, liesol, line_int, linearsol, matrixDE, matrix_riccati, maxdimsystems, moser_reduce, muchange, mult, mutest, newton_polygon, normalG2, ode_int_y, ode_y1, odeadvisor, odepde, parametricsol, particularsol, phaseportrait, poincare, polysols, power_equivalent, rational_equivalent, ratsols, redode, reduceOrder, reduce_order, regular_parts, regularsp, remove_RootOf, riccati_system, riccatisol, rifread, rifsimp, rightdivision, rtaylor, separablesol, singularities, solve_group, super_reduce, symgen, symmetric_power, symmetric_product, symtest, transinv, translate, untranslate, varparam, zoom*] **(4)**

```
> with(plots)
```

[*animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d, conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot, display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot, implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d, polyhedra_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions, setoptions3d, shadebetween, spacecurve,* **(5)** *sparsematrixplot, surfdata, textplot, textplot3d, tubeplot*]

```
> sist
```

$$\frac{d}{dt}\,x(t)=x(t)+4\,y(t),\ \frac{d}{dt}\,y(t)=x(t)+y(t) \tag{6}$$

```
> dsolve({sist},{x(t),y(t)})
```

$$\left\{x(t)=c_1\,e^{3\,t}+c_2\,e^{-t},\,y(t)=\frac{c_1\,e^{3\,t}}{2}-\frac{c_2\,e^{-t}}{2}\right\} \tag{7}$$

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

$$sol:=\left\{x(t)=c_1\,e^{3\,t}+c_2\,e^{-t},\,y(t)=\frac{c_1\,e^{3\,t}}{2}-\frac{c_2\,e^{-t}}{2}\right\} \tag{8}$$

1b

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

$$ec1:=\frac{d}{dt}\,x(t)=2\,x(t)-y(t) \tag{9}$$

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

$$ec2:=\frac{d}{dt}\,y(t)=x(t)+2\,y(t) \tag{10}$$

```
> sist:=ec1,ec2
```

$$sist:=\frac{d}{dt}\,x(t)=2\,x(t)-y(t),\ \frac{d}{dt}\,y(t)=x(t)+2\,y(t) \tag{11}$$

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

$$sol:=\left\{x(t)=e^{2\,t}\left(c_2\cos(t)+c_1\sin(t)\right),\,y(t)=-e^{2\,t}\left(\cos(t)\,c_1-\sin(t)\,c_2\right)\right\} \tag{12}$$

1c

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

$$ec1:=\frac{d}{dt}\,x(t)=x(t)-y(t)+z(t) \tag{13}$$

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

$$ec2:=\frac{d}{dt}\,y(t)=x(t)+y(t)-z(t) \tag{14}$$

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

$$ec3:=\frac{d}{dt}\,z(t)=-y(t)+2\,z(t) \tag{15}$$

```
> sist:=ec1,ec2,ec3
```

$$sist:=\frac{d}{dt}\,x(t)=x(t)-y(t)+z(t),\ \frac{d}{dt}\,y(t)=x(t)+y(t)-z(t),\ \frac{d}{dt}\,z(t)=-y(t)+2\,z(t) \tag{16}$$

```
> sol:=dsolve({sist},{x(t),y(t),z(t)})
```

$$sol:=\left\{x(t)=c_1\,e^{2\,t}+c_2\,e^{t}+c_3\,e^{t}\,t+c_3\,e^{t},\,y(t)=e^{t}\left(c_3\,t+c_2-c_3\right),\,z(t)=c_1\,e^{2\,t}+c_2\,e^{t}+c_3\,e^{t}\,t\right\} \tag{17}$$

1d

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

$$ec1 := \frac{d}{dt}\, x(t) = 5\, x(t) + 3\, y(t) + 1 \quad (18)$$

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

$$ec2 := \frac{d}{dt}\, y(t) = -6\, x(t) - 4\, y(t) + e^{-t} \quad (19)$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = 5\, x(t) + 3\, y(t) + 1,\ \frac{d}{dt}\, y(t) = -6\, x(t) - 4\, y(t) + e^{-t} \quad (20)$$

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

$$sol := \left\{x(t) = e^{2t}\, c_2 + e^{-t}\, c_1 - 2 - t\, e^{-t} - \frac{e^{-t}}{3},\ y(t) = -e^{2t}\, c_2 - 2\, e^{-t}\, c_1 + \frac{e^{-t}}{3} + 2\, t\, e^{-t} + 3\right\} \quad (21)$$

1e

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

$$ec1 := \frac{d}{dt}\, x(t) = x(t) + 3\, y(t) + \cos(t) \quad (22)$$

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

$$ec2 := \frac{d}{dt}\, y(t) = x(t) - y(t) + 2\, t \quad (23)$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = x(t) + 3\, y(t) + \cos(t),\ \frac{d}{dt}\, y(t) = x(t) - y(t) + 2\, t \quad (24)$$

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

$$sol := \left\{x(t) = 3\, e^{2t}\, c_2 - e^{-2t}\, c_1 + \frac{\sin(t)}{5} - \frac{\cos(t)}{5} - \frac{3\, t}{2},\ y(t) = e^{2t}\, c_2 + e^{-2t}\, c_1 - \frac{\cos(t)}{5} + \frac{t}{2} - \frac{1}{2}\right\} \quad (25)$$

1f

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

$$ec1 := \frac{d}{dt}\, x(t) = x(t) - 2\, y(t) - 2\, z(t) + e^{-t} \quad (26)$$

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

$$ec2 := \frac{d}{dt}\, y(t) = -2\, x(t) + y(t) + 2\, z(t) \quad (27)$$

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

$$ec3 := \frac{d}{dt}\, z(t) = 2\, x(t) - y(t) - 3\, z(t) + e^{-t} \quad (28)$$

```
> sist:=ec1,ec2,ec3
```

$$sist := \frac{d}{dt}\, x(t) = x(t) - 2\, y(t) - 2\, z(t) + e^{-t},\ \frac{d}{dt}\, y(t) = -2\, x(t) + y(t) + 2\, z(t),\ \frac{d}{dt}\, z(t) \quad (29)$$

$= 2\,x(t) - y(t) - 3\,z(t) + \mathrm{e}^{-t}$

```
> sol:=dsolve({sist},{x(t),y(t),z(t)})
```

$$sol := \left\{x(t) = -c_2\,\mathrm{e}^{\sqrt{3}\,t} - c_3\,\mathrm{e}^{-\sqrt{3}\,t} + \mathrm{e}^{-t}\,c_1 + t\,\mathrm{e}^{-t}, y(t) = c_2\,\mathrm{e}^{\sqrt{3}\,t} + c_3\,\mathrm{e}^{-\sqrt{3}\,t}, z(t) = \frac{c_2\sqrt{3}\,\mathrm{e}^{\sqrt{3}\,t}}{2} - \frac{c_3\sqrt{3}\,\mathrm{e}^{-\sqrt{3}\,t}}{2} - \frac{3\,c_2\,\mathrm{e}^{\sqrt{3}\,t}}{2} - \frac{3\,c_3\,\mathrm{e}^{-\sqrt{3}\,t}}{2} + \mathrm{e}^{-t}\,c_1 + t\,\mathrm{e}^{-t}\right\} \tag{30}$$

2a

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

$$ec1 := \frac{\mathrm{d}}{\mathrm{d}t}\,x(t) = x(t) + 4\,y(t) \tag{31}$$

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

$$ec2 := \frac{\mathrm{d}}{\mathrm{d}t}\,y(t) = x(t) + y(t) \tag{32}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{\mathrm{d}}{\mathrm{d}t}\,x(t) = x(t) + 4\,y(t), \frac{\mathrm{d}}{\mathrm{d}t}\,y(t) = x(t) + y(t) \tag{33}$$

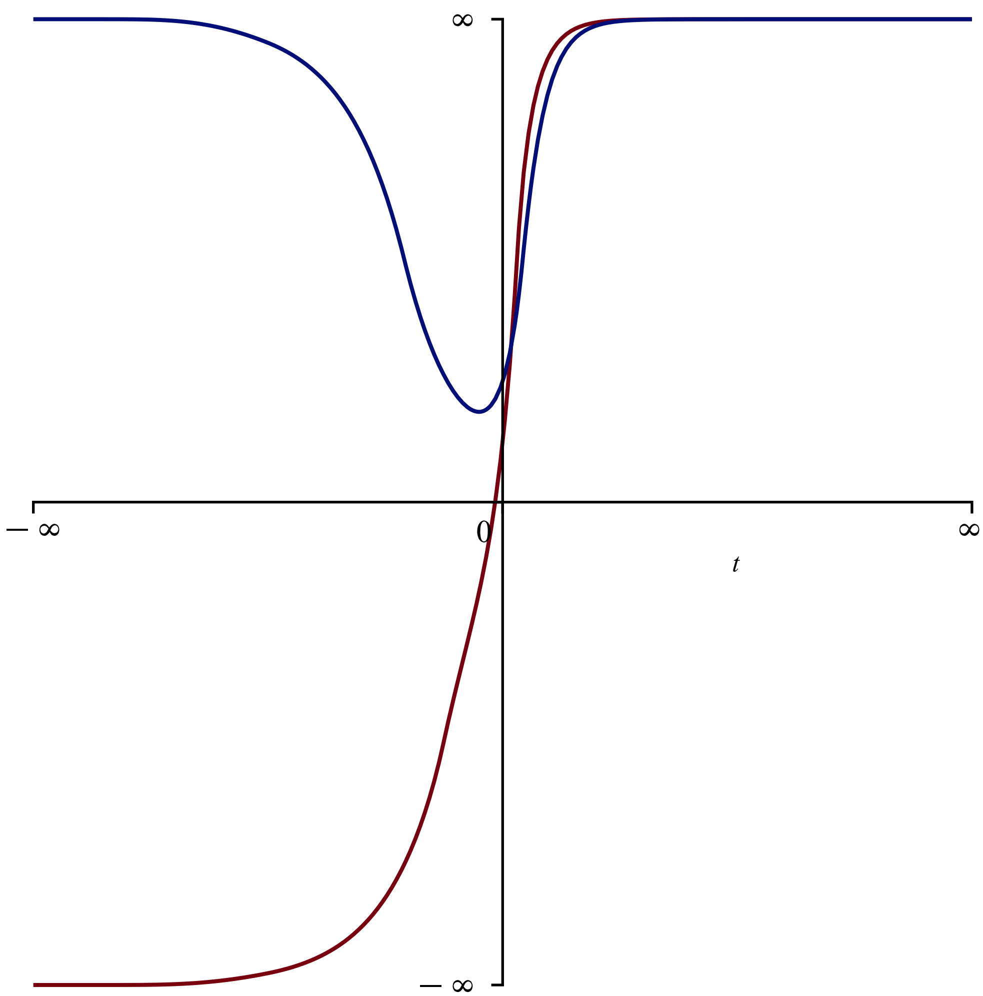
```
> cond_in:=x(0)=1,y(0)=2
```

$$cond\_in := x(0) = 1, y(0) = 2 \tag{34}$$

```
> sol:=dsolve({sist,cond_in},{x(t),y(t)})
```

$$sol := \left\{x(t) = \frac{5\,\mathrm{e}^{3\,t}}{2} - \frac{3\,\mathrm{e}^{-t}}{2}, y(t) = \frac{5\,\mathrm{e}^{3\,t}}{4} + \frac{3\,\mathrm{e}^{-t}}{4}\right\} \tag{35}$$

```
> plot([unapply(rhs(sol[1]), t)(t),unapply(rhs(sol[2]), t)(t)],t=-
  infinity..infinity)
```



2b

```
> ec1:=diff(x(t),t)=x(t)-y(t)+t-1
```

$$ec1 := \frac{d}{dt}\, x(t) = x(t) - y(t) + t - 1 \qquad \textbf{(36)}$$

```
> ec2:=diff(y(t),t)=-2*x(t)+4*y(t)+cos(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = -2\, x(t) + 4\, y(t) + \cos(t) \qquad \textbf{(37)}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = x(t) - y(t) + t - 1,\ \frac{d}{dt}\, y(t) = -2\, x(t) + 4\, y(t) + \cos(t) \qquad \textbf{(38)}$$

```
> cond_in:=x(0)=0,y(0)=1
```

$$cond\_in := x(0) = 0, y(0) = 1 \qquad \textbf{(39)}$$

```
> sol:=dsolve({sist,cond_in},{x(t),y(t)})
```

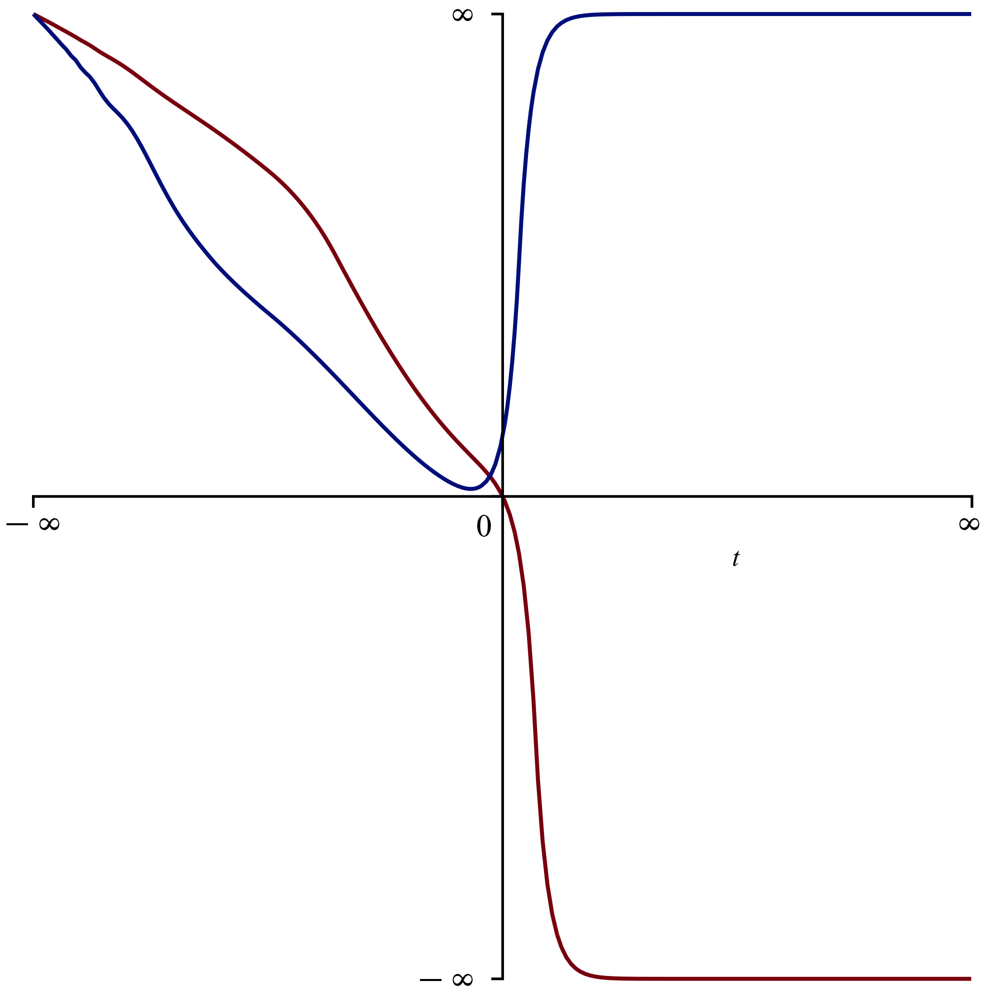
$$sol := \Bigg\{ x(t) = \mathrm{e}^{\frac{(5+\sqrt{17})\, t}{2}} \left(\frac{33}{26} - \frac{5\sqrt{17}}{13}\right) + \mathrm{e}^{-\frac{(-5+\sqrt{17})\, t}{2}} \left(\frac{33}{26} + \frac{5\sqrt{17}}{13}\right) + \frac{5\sin(t)}{26} \qquad \textbf{(40)}$$

$$-\frac{\cos(t)}{26}-2\,t-\frac{5}{2}, y(t) = -\frac{e^{\frac{(5+\sqrt{17})\,t}{2}}\left(\frac{33}{26}-\frac{5\sqrt{17}}{13}\right)\sqrt{17}}{2}$$

$$+\frac{e^{-\frac{(-5+\sqrt{17})\,t}{2}}\left(\frac{33}{26}+\frac{5\sqrt{17}}{13}\right)\sqrt{17}}{2}-\frac{3\,e^{\frac{(5+\sqrt{17})\,t}{2}}\left(\frac{33}{26}-\frac{5\sqrt{17}}{13}\right)}{2}$$

$$-\frac{3\,e^{-\frac{(-5+\sqrt{17})\,t}{2}}\left(\frac{33}{26}+\frac{5\sqrt{17}}{13}\right)}{2}-\frac{3\cos(t)}{13}+\frac{2\sin(t)}{13}-t-\frac{3}{2}\Big\}$$

```
> plot([unapply(rhs(sol[1]), t)(t),unapply(rhs(sol[2]), t)(t)],t=-infinity..infinity)
```



2c

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

$$ec1 := \frac{d}{dt}\,x(t) = x(t)+2\,y(t)+e^{-t} \qquad \textbf{(41)}$$

```
> ec2:=diff(y(t),t)=-2*x(t)+y(t)+1
```

$$ec2 := \frac{d}{dt}\, y(t) = -2\, x(t) + y(t) + 1 \tag{42}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = x(t) + 2\, y(t) + e^{-t},\ \frac{d}{dt}\, y(t) = -2\, x(t) + y(t) + 1 \tag{43}$$

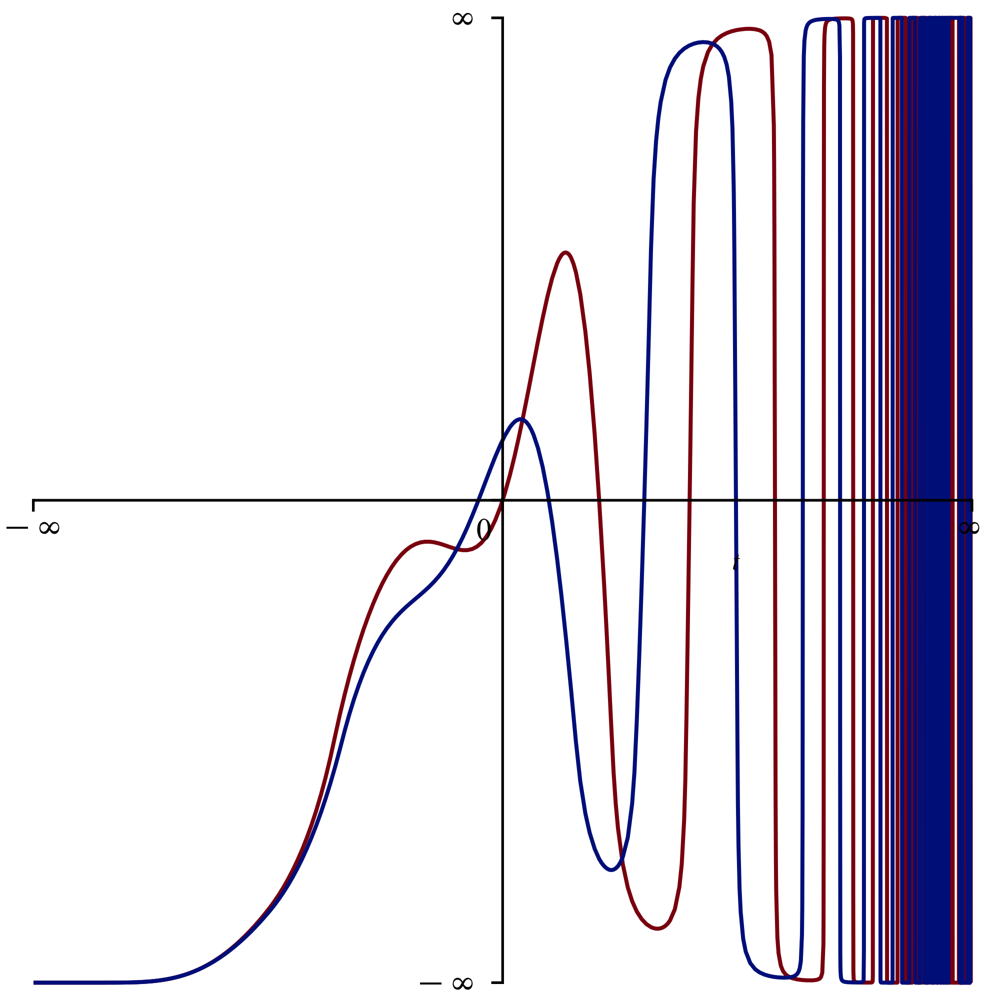
```
> cond_in:=x(0)=0,y(0)=1
```

$$cond\_in := x(0) = 0,\ y(0) = 1 \tag{44}$$

```
> sol:=dsolve({sist,cond_in},{x(t),y(t)})
```

$$sol := \left\{x(t) = -\frac{3\, e^{t}\cos(2\,t)}{20} + \frac{29\, e^{t}\sin(2\,t)}{20} - \frac{e^{-t}}{4} + \frac{2}{5},\ y(t) = \frac{3\, e^{t}\sin(2\,t)}{20} + \frac{29\, e^{t}\cos(2\,t)}{20} - \frac{1}{5} - \frac{e^{-t}}{4}\right\} \tag{45}$$

```
> plot([unapply(rhs(sol[1]), t)(t),unapply(rhs(sol[2]), t)(t)],t=-infinity..infinity)
```



2d

```
> ec1:=diff(x(t),t)=-x(t)+3*y(t)+3*z(t)+27*t*t
```

$$ec1 := \frac{d}{dt}\, x(t) = -x(t) + 3\, y(t) + 3\, z(t) + 27\, t^2 \tag{46}$$

```
> ec2:=diff(y(t),t)=2*x(t)-2*y(t)-5*z(t)+3*t
```

$$ec2 := \frac{d}{dt}\, y(t) = 2\,x(t) - 2\,y(t) - 5\,z(t) + 3\,t \tag{47}$$

```
> ec3:=diff(z(t),t)=-2*x(t)+3*y(t)+6*z(t)+3
```

$$ec3 := \frac{d}{dt}\, z(t) = -2\,x(t) + 3\,y(t) + 6\,z(t) + 3 \tag{48}$$

```
> sist:=ec1,ec2,ec3
```

$$sist := \frac{d}{dt}\, x(t) = -x(t) + 3\,y(t) + 3\,z(t) + 27\,t^2,\ \frac{d}{dt}\, y(t) = 2\,x(t) - 2\,y(t) - 5\,z(t) + 3\,t,\ \frac{d}{dt}\, z(t) = -2\,x(t) + 3\,y(t) + 6\,z(t) + 3 \tag{49}$$

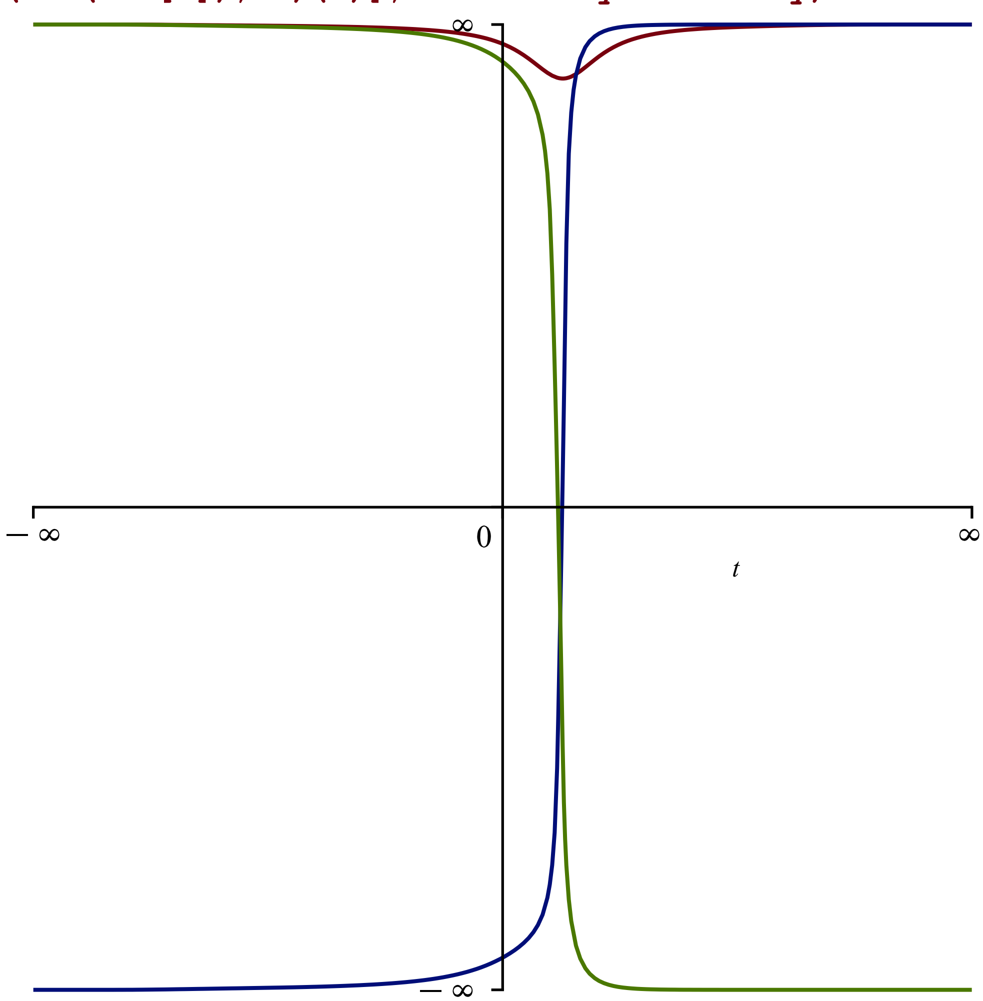
```
> cond_in:=x(0)=50,y(0)=-30,z(0)=26
```

$$cond\_in := x(0) = 50,\ y(0) = -30,\ z(0) = 26 \tag{50}$$

```
> sol:=dsolve({sist,cond_in},{x(t),y(t),z(t)})
```

$$sol := \{x(t) = 3\,e^{t} + 2\,e^{-t} + 27\,t^2 - 63\,t + 45,\ y(t) = e^{3\,t} + 2\,e^{t} - 18\,t^2 + 24\,t - 32 - e^{-t},\ z(t) = -e^{3\,t} - 27\,t + 26 + 18\,t^2 + e^{-t}\} \tag{51}$$

```
> plot([unapply(rhs(sol[1]), t)(t),unapply(rhs(sol[2]), t)(t),
  unapply(rhs(sol[3]), t)(t)],t=-infinity..infinity)
```



3a

```
> ec1:=diff(x(t),t)=x(t)+y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = x(t) + y(t) \tag{52}$$

```
> ec2:=diff(y(t),t)=-2*x(t)+4*y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = -2\, x(t) + 4\, y(t) \tag{53}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = x(t) + y(t),\ \frac{d}{dt}\, y(t) = -2\, x(t) + 4\, y(t) \tag{54}$$

```
> sol1:=dsolve({sist,x(0)=3,y(0)=0},{x(t),y(t)})
```

$$sol1 := \{x(t) = -3\, e^{3\,t} + 6\, e^{2\,t}, y(t) = -6\, e^{3\,t} + 6\, e^{2\,t}\} \tag{55}$$

```
> sol2:=dsolve({sist,x(0)=0,y(0)=3},{x(t),y(t)})
```

$$sol2 := \{x(t) = 3\, e^{3\,t} - 3\, e^{2\,t}, y(t) = 6\, e^{3\,t} - 3\, e^{2\,t}\} \tag{56}$$

```
> sol3:=dsolve({sist,x(0)=-3,y(0)=0},{x(t),y(t)})
```

$$sol3 := \{x(t) = 3\, e^{3\,t} - 6\, e^{2\,t}, y(t) = 6\, e^{3\,t} - 6\, e^{2\,t}\} \tag{57}$$

```
> sol4:=dsolve({sist,x(0)=0,y(0)=-3},{x(t),y(t)})
```

$$sol4 := \{x(t) = -3\, e^{3\,t} + 3\, e^{2\,t}, y(t) = -6\, e^{3\,t} + 3\, e^{2\,t}\} \tag{58}$$

3b

```
> lim1:=limit(sol1[1],t=infinity),limit(sol1[2],t=infinity)
```

$$lim1 := \lim_{t \to \infty} x(t) = -\infty, \lim_{t \to \infty} y(t) = -\infty \tag{59}$$

```
> lim2:=limit(sol2[1],t=infinity),limit(sol2[2],t=infinity)
```

$$lim2 := \lim_{t \to \infty} x(t) = \infty, \lim_{t \to \infty} y(t) = \infty \tag{60}$$

```
> lim3:=limit(sol3[1],t=infinity),limit(sol3[2],t=infinity)
```

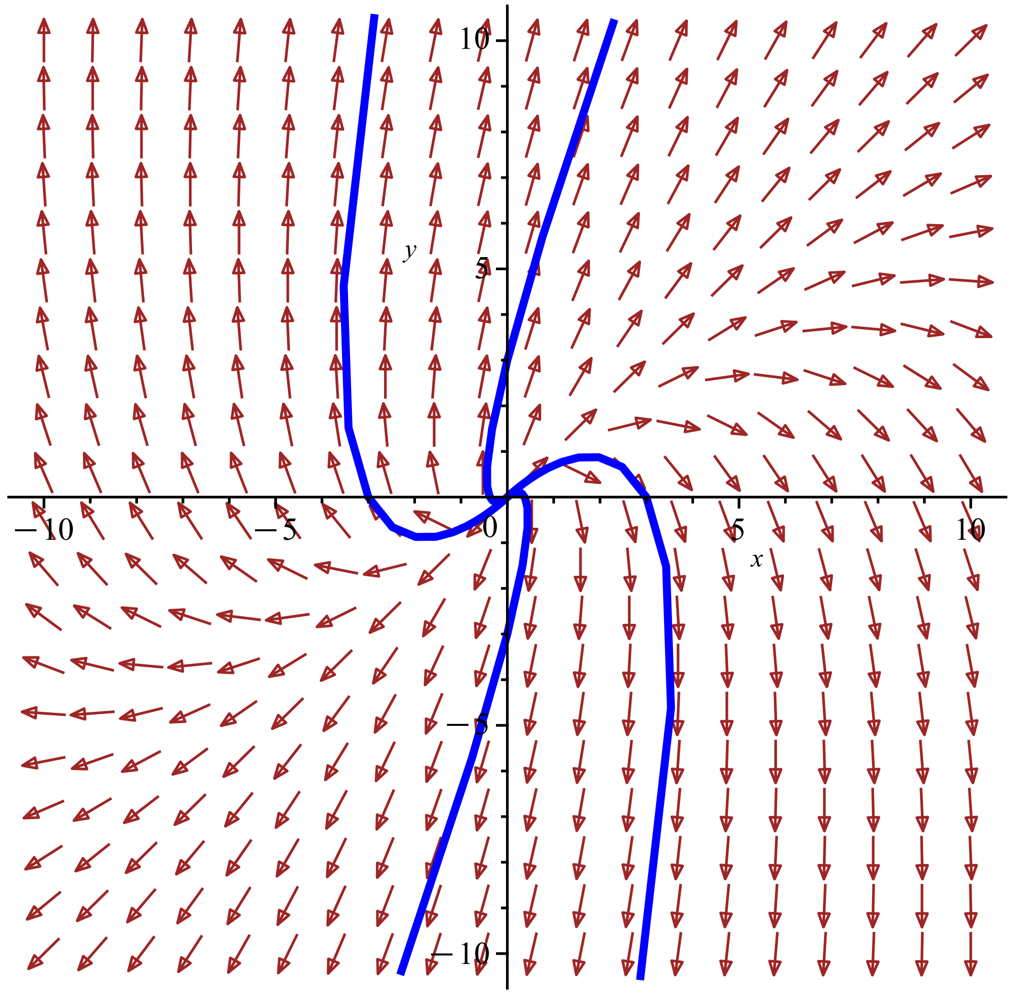
$$lim3 := \lim_{t \to \infty} x(t) = \infty, \lim_{t \to \infty} y(t) = \infty \tag{61}$$

```
> lim4:=limit(sol4[1],t=infinity),limit(sol4[2],t=infinity)
```

$$lim4 := \lim_{t \to \infty} x(t) = -\infty, \lim_{t \to \infty} y(t) = -\infty \tag{62}$$

3c

```
> DEplot([sist],[x(t),y(t)],t=-4..4,x=-10..10,y=-10..10, [[x(0)=3,y
  (0)=0], [x(0)=0,y(0)=3], [x(0)=-3,y(0)=0], [x(0)=0,y(0)=-3]],
  arrows=medium,linecolor=blue);
```




```
> 1/2
```

$$\frac{1}{2} \tag{63}$$

4a

```
> ec1:=diff(x(t),t)=y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = y(t) \tag{64}$$

```
> ec2:=diff(y(t),t)=-x(t)-2*y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = -x(t) - 2\, y(t) \tag{65}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = y(t),\ \frac{d}{dt}\, y(t) = -x(t) - 2\, y(t) \tag{66}$$

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

$$sol := \left\{x(t) = e^{-t}\left(c_2\, t + c_1\right), y(t) = -e^{-t}\left(c_2\, t + c_1 - c_2\right)\right\} \tag{67}$$

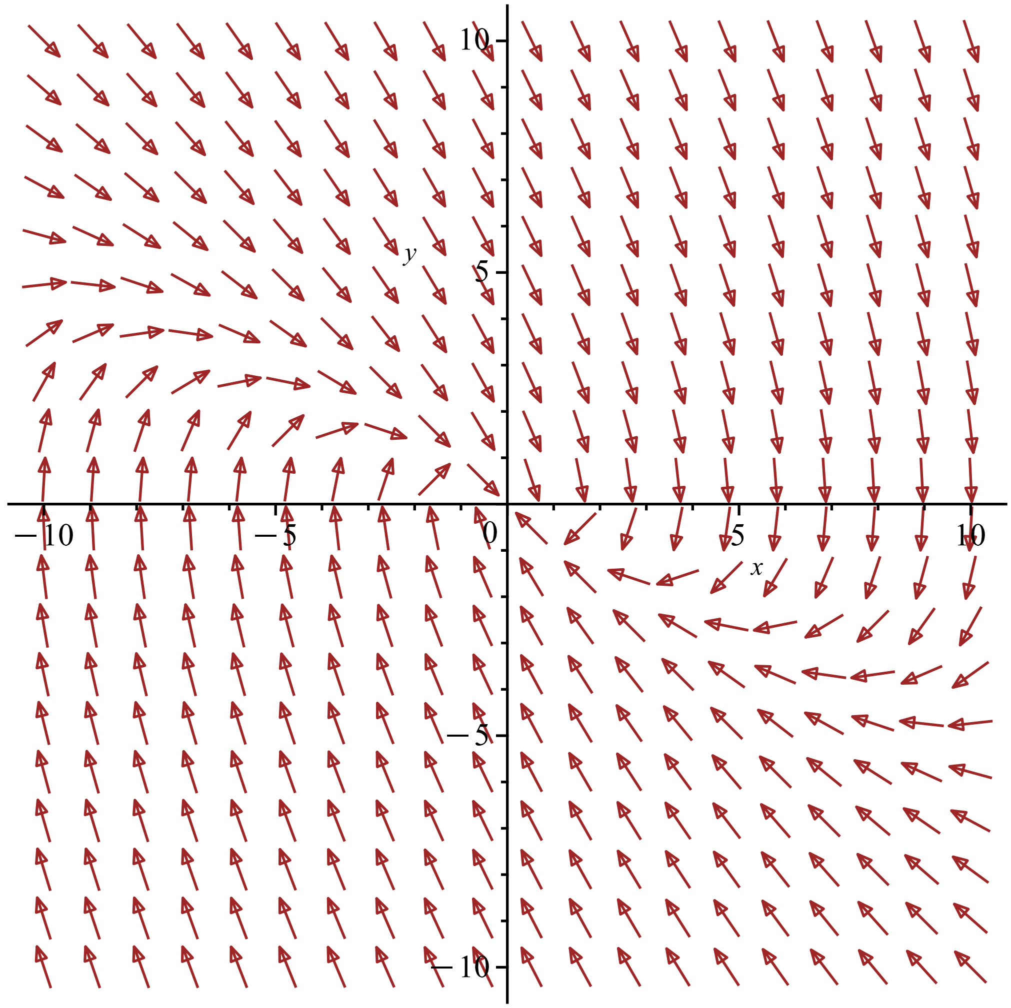
4b

```
> lim:=limit(sol[1], t=infinity),limit(sol[2],t=infinity)
```

$$\lim := \lim_{t \to \infty} x(t) = 0, \lim_{t \to \infty} y(t) = 0 \tag{68}$$

4c

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=medium,linecolor=blue)
```



5a

```
> ec1:=diff(x(t),t)=2*x(t)+y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = 2\, x(t) + y(t) \quad (69)$$

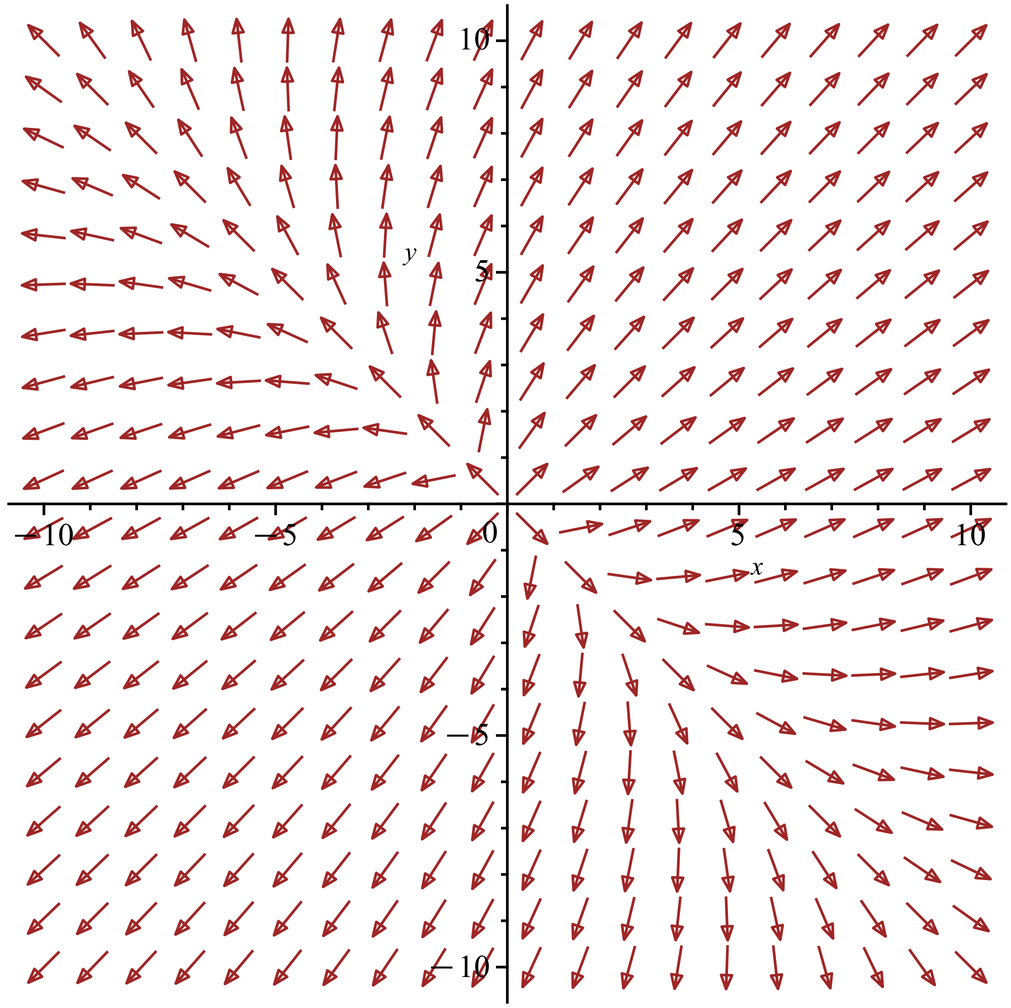
```
> ec2:=diff(y(t),t)=x(t)+2*y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = x(t) + 2\, y(t) \quad (70)$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = 2\, x(t) + y(t),\ \frac{d}{dt}\, y(t) = x(t) + 2\, y(t) \quad (71)$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=medium,linecolor=blue)
```



Limitele NU tind spre 0
5b

```
> ec1:=diff(x(t),t)=-x(t)-y(t)
```

$$ec1 := \frac{\mathrm{d}}{\mathrm{d}t}\, x(t) = -x(t) - y(t) \tag{72}$$

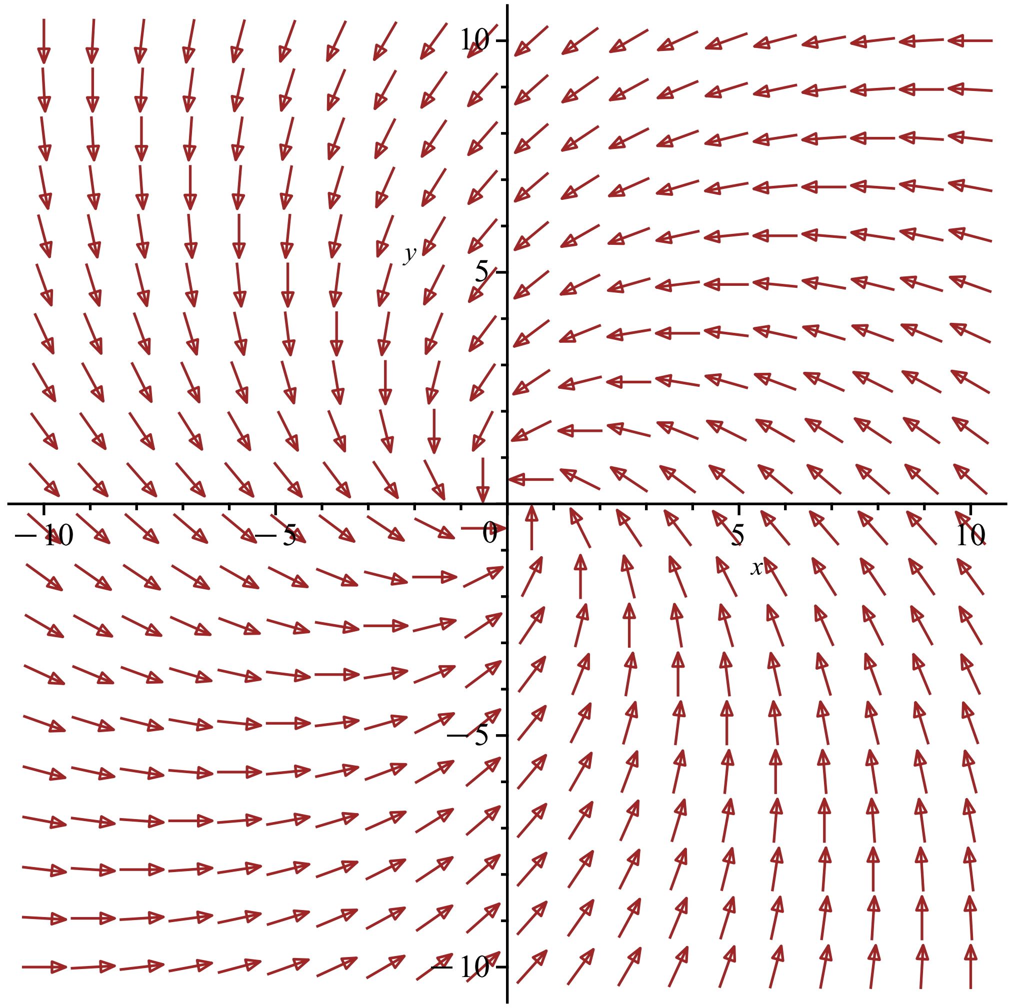
```
> ec2:=diff(y(t),t)=x(t)-y(t)
```

$$ec2 := \frac{\mathrm{d}}{\mathrm{d}t}\, y(t) = x(t) - y(t) \tag{73}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{\mathrm{d}}{\mathrm{d}t}\, x(t) = -x(t) - y(t),\ \frac{\mathrm{d}}{\mathrm{d}t}\, y(t) = x(t) - y(t) \tag{74}$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=
  medium,linecolor=blue)
```



Limitele tind spre 0
5c

```
> ec1:=diff(x(t),t)=y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = y(t) \qquad (75)$$

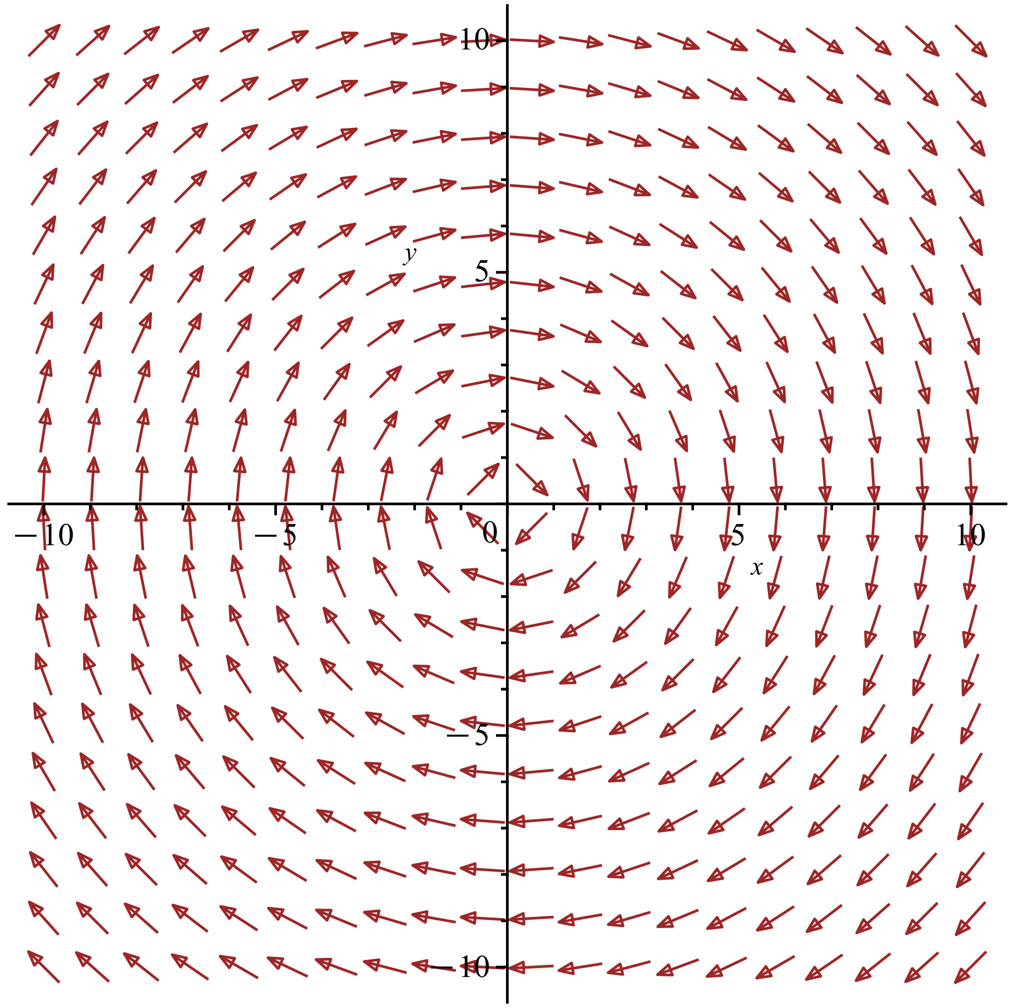
```
> ec2:=diff(y(t),t)=-x(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = -x(t) \qquad (76)$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = y(t),\ \frac{d}{dt}\, y(t) = -x(t) \qquad (77)$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=
  medium,linecolor=blue)
```



Limitele NU tind spre 0
5d

```
> ec1:=diff(x(t),t)=-2*x(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = -2\, x(t) \tag{78}$$

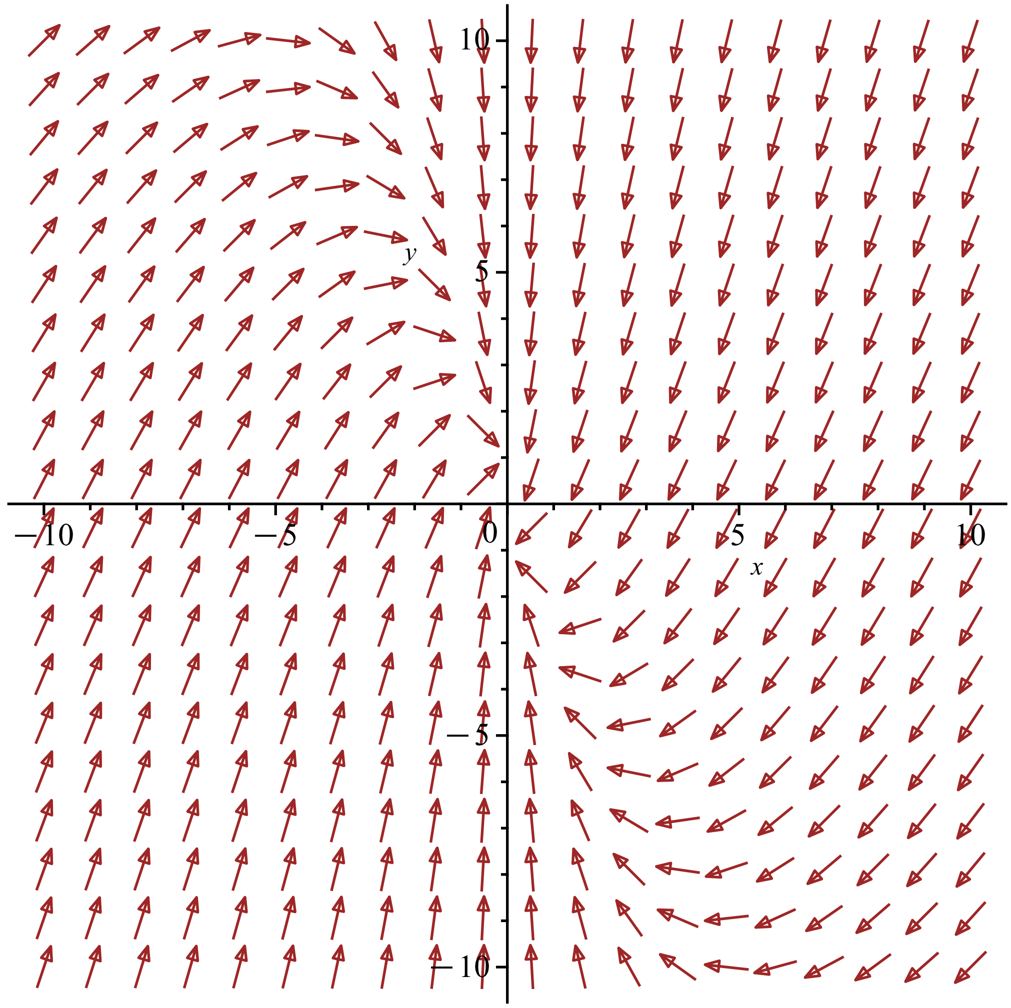
```
> ec2:=diff(y(t),t)=-4*x(t)-2*y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = -4\, x(t) - 2\, y(t) \tag{79}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = -2\, x(t),\ \frac{d}{dt}\, y(t) = -4\, x(t) - 2\, y(t) \tag{80}$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=
  medium,linecolor=blue)
```



Limitele tind spre 0
5e

```
> ec1:=diff(x(t),t)=x(t)-4*y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = x(t) - 4\, y(t) \qquad \textbf{(81)}$$

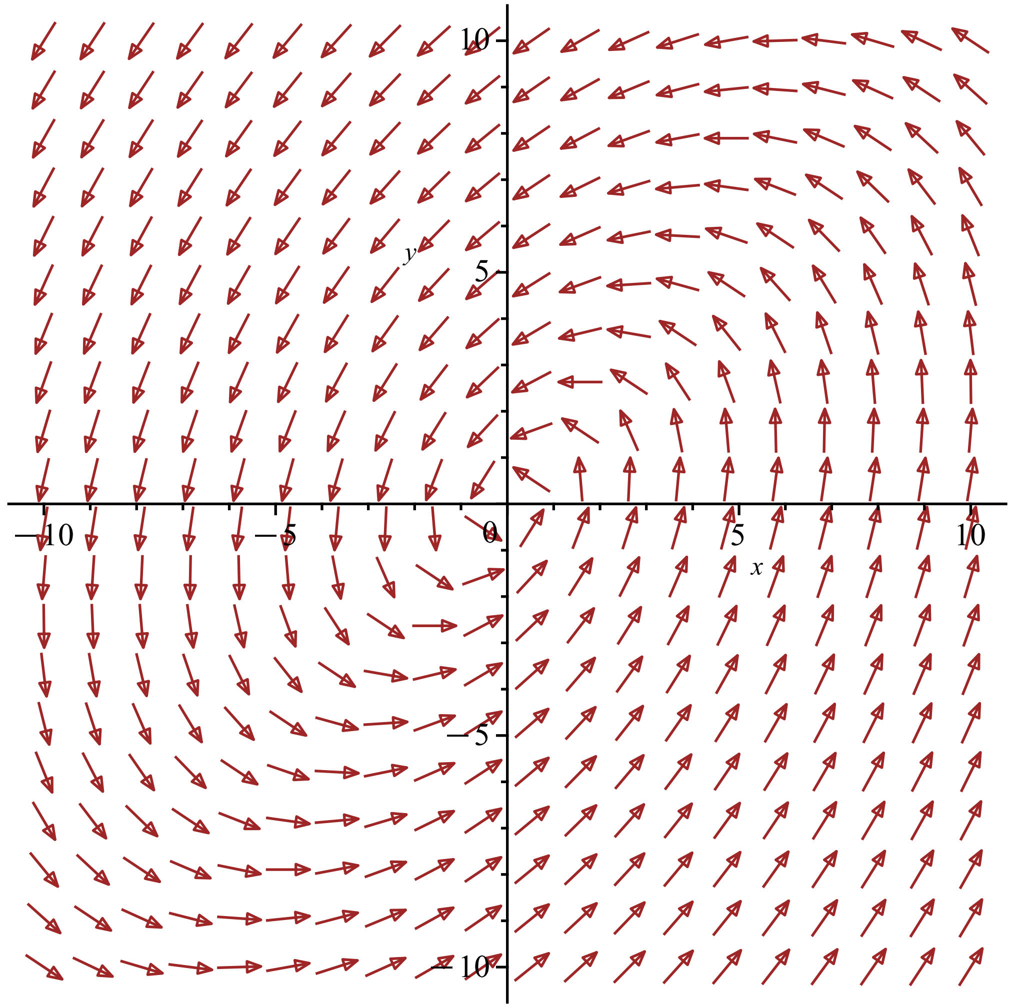
```
> ec2:=diff(y(t),t)=5*x(t)-3*y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = 5\, x(t) - 3\, y(t) \qquad \textbf{(82)}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = x(t) - 4\, y(t),\ \frac{d}{dt}\, y(t) = 5\, x(t) - 3\, y(t) \qquad \textbf{(83)}$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=
  medium,linecolor=blue)
```



Limitele NU tind spre 0

5f

```
> ec1:=diff(x(t),t)=3*x(t)-y(t)
```

$$ec1 := \frac{d}{dt}\, x(t) = 3\, x(t) - y(t) \tag{84}$$

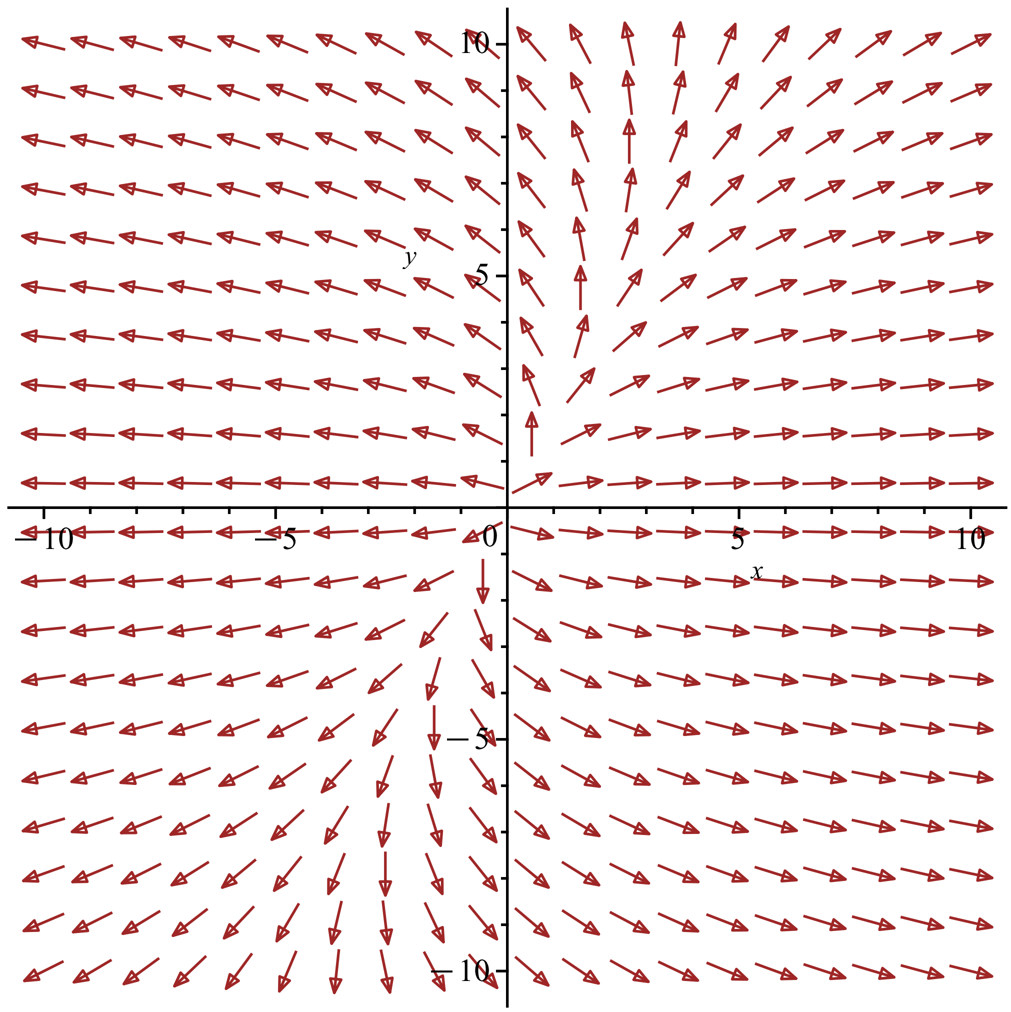
```
> ec2:=diff(y(t),t)=y(t)
```

$$ec2 := \frac{d}{dt}\, y(t) = y(t) \tag{85}$$

```
> sist:=ec1,ec2
```

$$sist := \frac{d}{dt}\, x(t) = 3\, x(t) - y(t),\ \frac{d}{dt}\, y(t) = y(t) \tag{86}$$

```
> DEplot([sist],[x(t),y(t)],t=-100..100,x=-10..10,y=-10..10,arrows=
  medium,linecolor=blue)
```



Limitele NU tind spre 0