```
> dgl:=diff(y(x),x)=y(x);
```

$$dgl := \frac{\partial}{\partial x} y(x) = y(x)$$

```
> dgl;
```

$$\frac{\partial}{\partial x} y(x) = y(x)$$

```
> dsolve(dgl);
```

$$y(x) = \_C1\ \mathbf{e}^{x}$$

```
> dgl:=D(y)(x)=y(x);
```

$$dgl := D(y)(x) = y(x)$$

```
> dsolve(dgl);
```

$$y(x) = \_C1\ \mathbf{e}^{x}$$

```
> dsolve({dgl,y(0)=3},y(x));
```

$$y(x) = 3\ \mathbf{e}^{x}$$

```
> dgl:=diff(y(x),x)=y(x)-y(x)^2;
```

$$dgl := \frac{\partial}{\partial x} y(x) = y(x) - y(x)^2$$

```
> dgl;
```

$$\frac{\partial}{\partial x} y(x) = y(x) - y(x)^2$$

```
> dsolve(dgl);
```

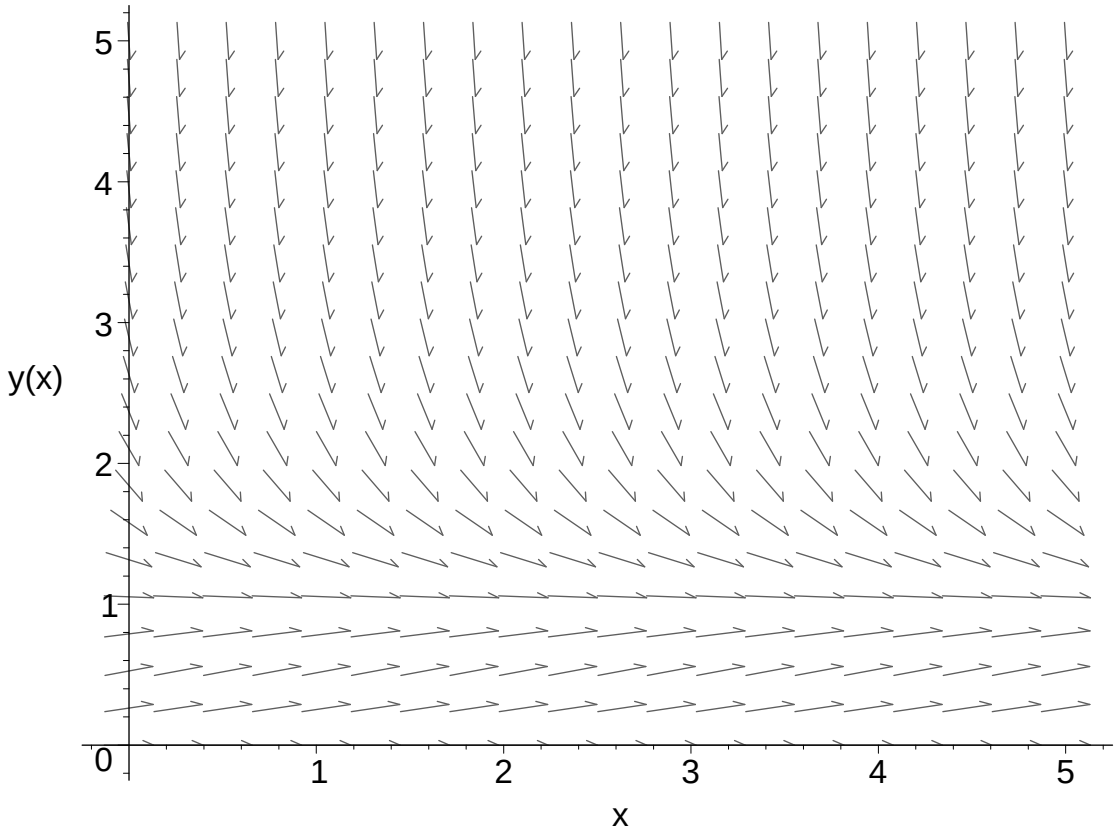
$$y(x) = \frac{1}{1 + \mathbf{e}^{(-x)}\ \_C1}$$

```
> with(DEtools);
```

[*DEnormal*, *DEplot*, *DEplot3d*, *DEplot_polygon*, *DFactor*,

DFactorLCLM, DFactorsols, Dchangevar, GCRD, LCLM, MeijerGsols, PDEchangecoords, RiemannPsols, Xchange, Xcommutator, Xgauge, abelsol, adjoint, autonomous, bernoullisol, buildsol, buildsym, canoni, caseplot, casesplit, checkrank, chinisol, clairautsol, constcoeffsols, convertAlg, convertsys, dalembertsol, dcoeffs, de2diffop, dfieldplot, diffop2de, 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, 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, odeadvisor, odepde, parametricsol, phaseportrait, poincare, polysols, ratsols, redode, reduceOrder, reduce_order, regular_parts, regularsp, remove_RootOf, riccati_system, riccatisol, rifread, rifsimp, rightdivision, rtaylor, separablesol, solve_group, super_reduce, symgen, symmetric_power, symmetric_product, symtest, transinv, translate, untranslate, varparam, zoom]

```
> DEplot(dgl,y(x),x=0..5,y=0..5);
```




```
> p2:=DEplot(dgl,y(x),x=0..5,y=0..5):
> dsolve({dgl,y(1)=4},y(x));
```

$$y(x) = \frac{1}{1 - \frac{3}{4}\frac{\mathbf{e}^{(-x)}}{\mathbf{e}^{(-1)}}}$$

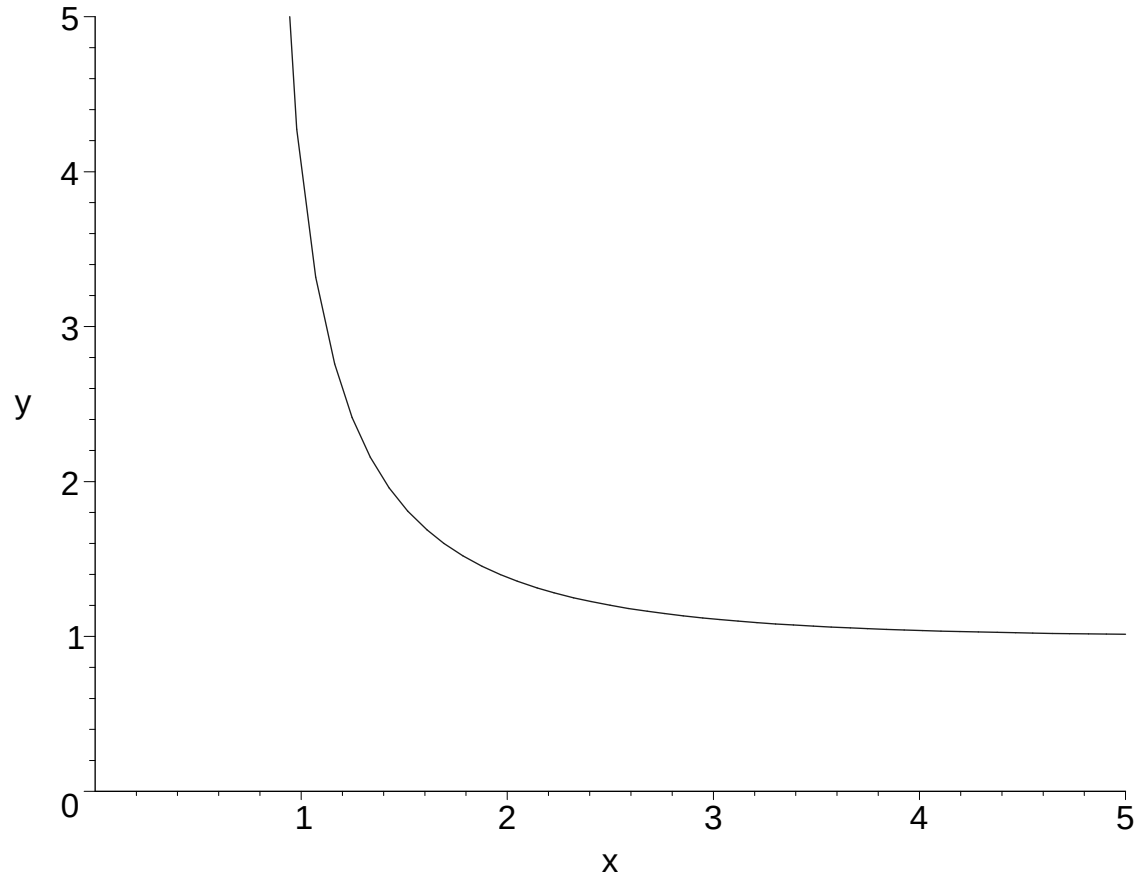
```
> f:=rhs(%);
```

$$f := \frac{1}{1 - \frac{3}{4}\frac{\mathbf{e}^{(-x)}}{\mathbf{e}^{(-1)}}}$$

```
> f;
```

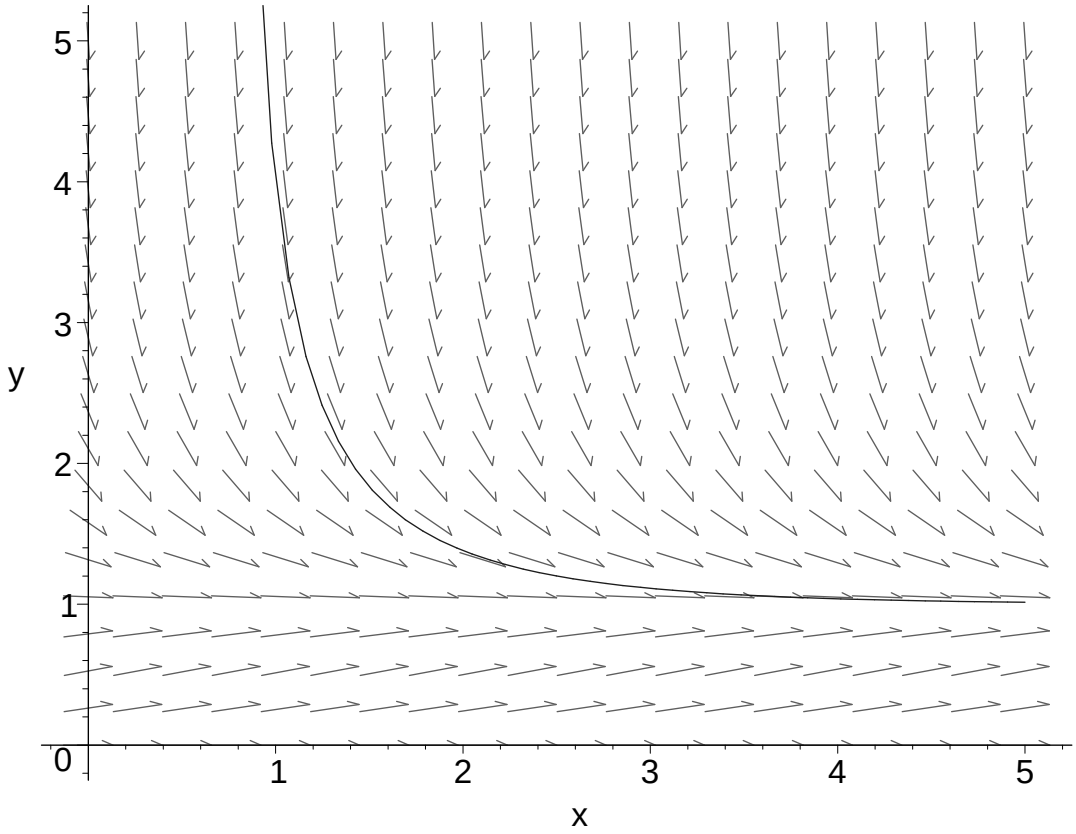
$$\frac{1}{1-\frac{3}{4}\frac{\mathbf{e}^{(-x)}}{\mathbf{e}^{(-1)}}}$$

```
> plot(f(x),x=0..5,y=0..5,discont=true,color=
  blue);
```

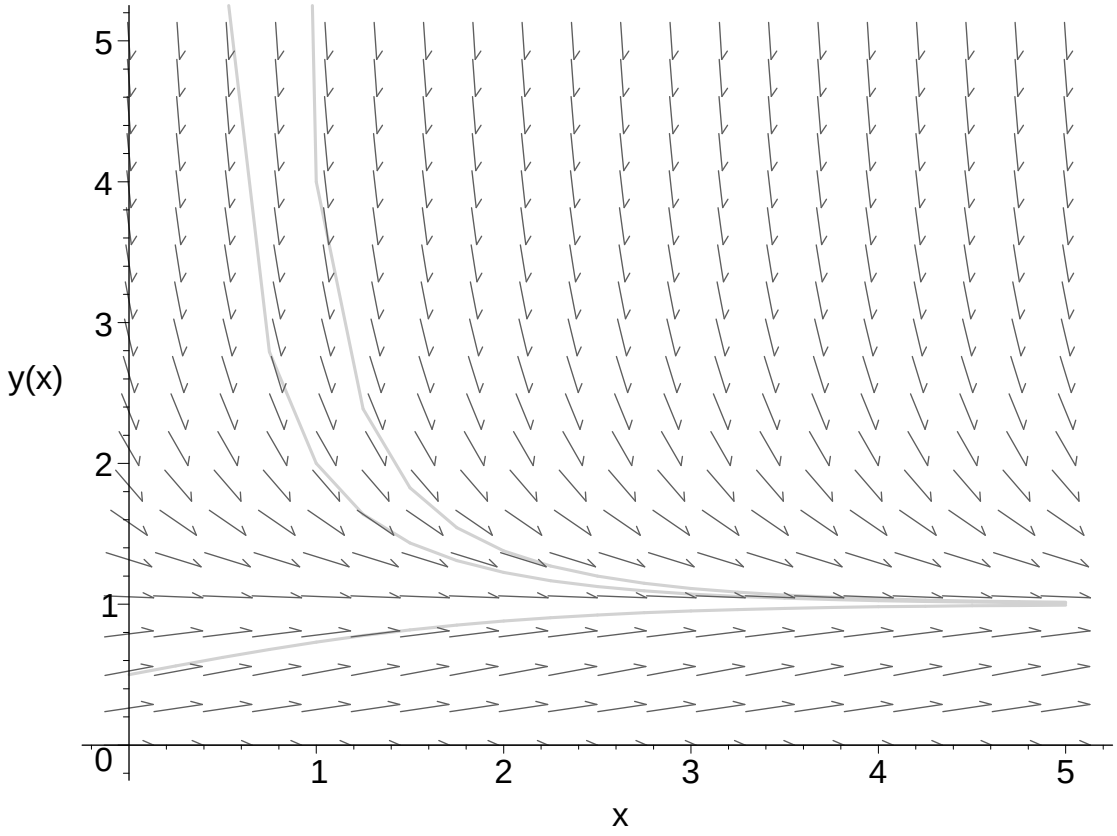



```
> p1:=plot(f(x),x=0..5,y=0..5,discont=true,co
  lor=blue):
> with(plots):
Warning, the name changecoords has been redefined

> display({p1,p2});
```




```
> DEplot(dgl,y(x),x=0..5,y=0..5,[[y(1)=4],[y(
  1)=2],[y(0)=1/2]]);
```




```
> dgl:=diff(x(t),t,t)+2*diff(x(t),t)+17*x(t)=
  0;
```

$$dgl := \left(\frac{\partial^2}{\partial t^2}\,\mathrm{x}(t)\right) + 2\left(\frac{\partial}{\partial t}\,\mathrm{x}(t)\right) + 17\,\mathrm{x}(t) = 0$$

```
> dgl;
```

$$\left(\frac{\partial^2}{\partial t^2}\,\mathrm{x}(t)\right) + 2\left(\frac{\partial}{\partial t}\,\mathrm{x}(t)\right) + 17\,\mathrm{x}(t) = 0$$

```
> dsolve(dgl);
```

$$\mathrm{x}(t) = \_C1\,\mathbf{e}^{(-t)}\sin(4\,t) + \_C2\,\mathbf{e}^{(-t)}\cos(4\,t)$$

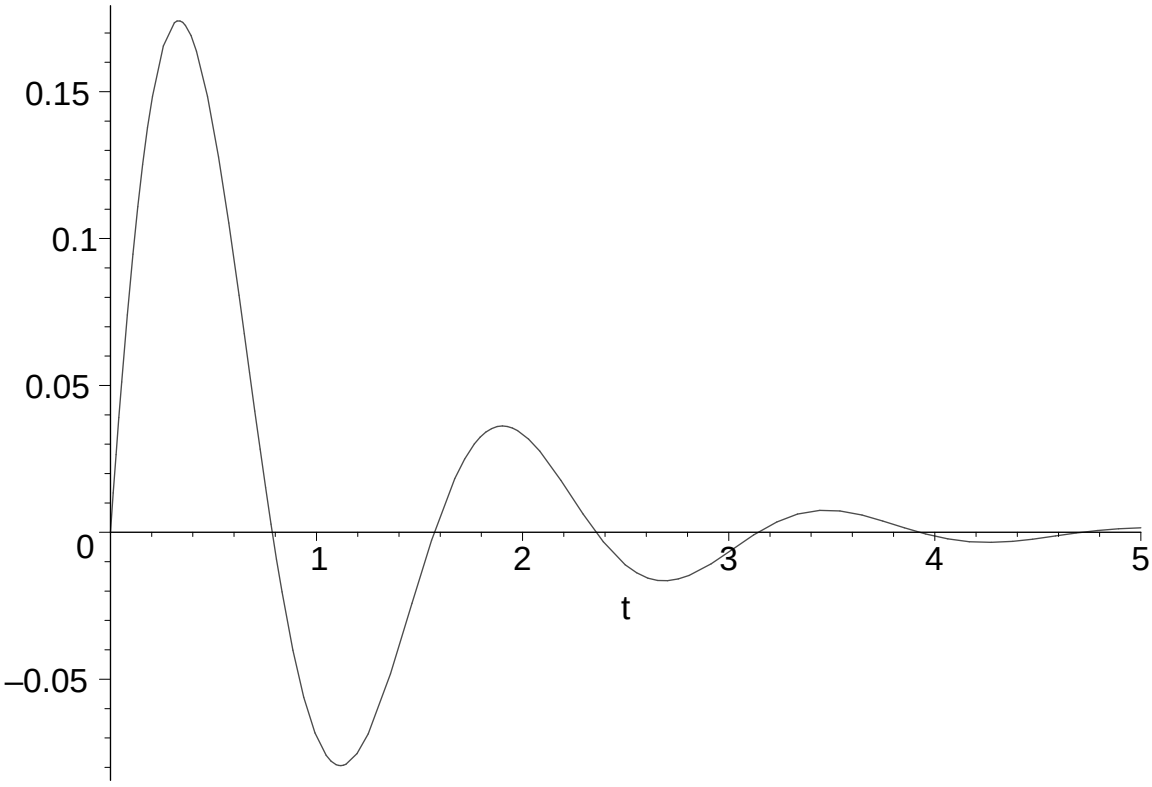
```
> dsolve({dgl,x(0)=0,D(x)(0)=1},x(t));
```

$$x(t) = \frac{1}{4}\,\mathbf{e}^{(-t)}\sin(4\,t)$$

```
> f:=rhs(%);
```

$$f := \frac{1}{4}\,\mathbf{e}^{(-t)}\sin(4\,t)$$

```
> plot(f,t=0..5);
```




```
> dgl:=diff(x(t),t,t)+2*diff(x(t),t)+17*x(t)=
  cos(t);
```

$$dgl := \left(\frac{\partial^2}{\partial t^2}\,x(t)\right) + 2\left(\frac{\partial}{\partial t}\,x(t)\right) + 17\,x(t) = \cos(t)$$

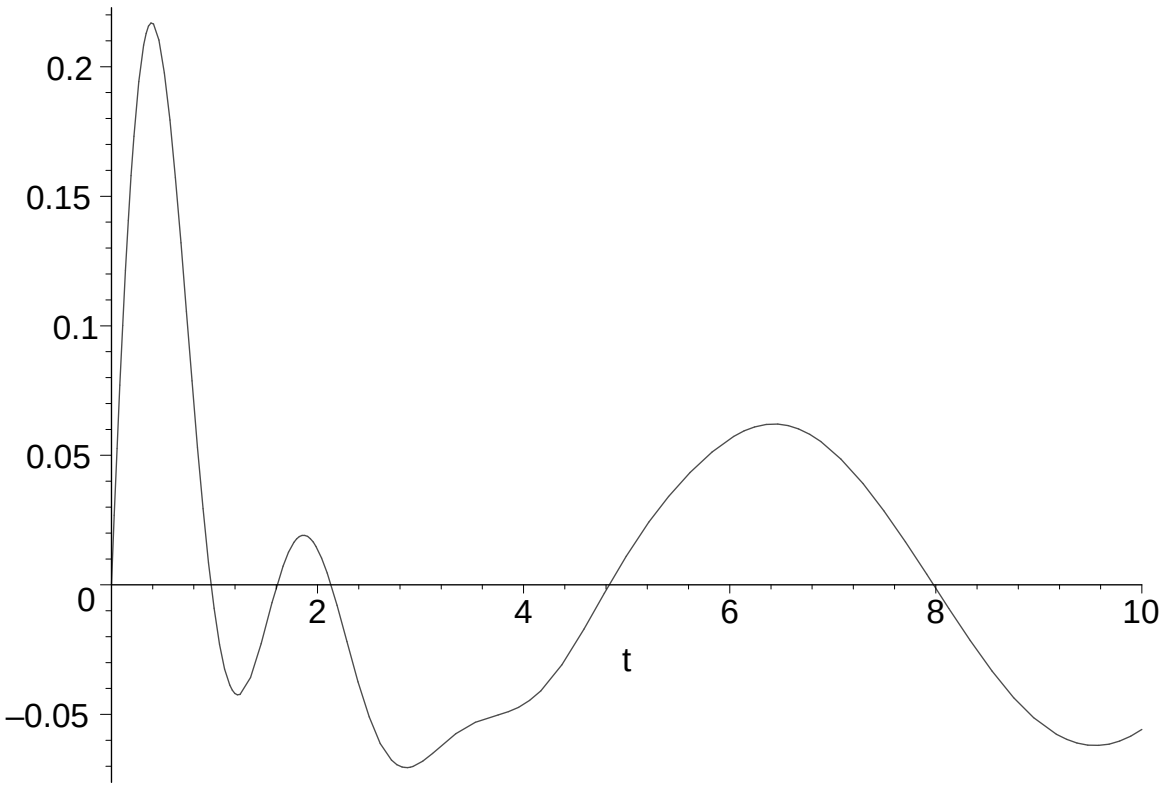
```
> dsolve({dgl,x(0)=0,D(x)(0)=1},x(t));
```

$$x(t) = \frac{121}{520}\,\mathbf{e}^{(-t)}\sin(4t) - \frac{4}{65}\,\mathbf{e}^{(-t)}\cos(4t) + \frac{4}{65}\cos(t) + \frac{1}{130}\sin(t)$$

```
> f:=rhs(%);
```

$$f := \frac{121}{520}\,\mathbf{e}^{(-t)}\sin(4t) - \frac{4}{65}\,\mathbf{e}^{(-t)}\cos(4t) + \frac{4}{65}\cos(t) + \frac{1}{130}\sin(t)$$

```
> plot(f,t=0..10);
```




```
> dgl:=diff(x(t),t,t)+sin(x(t))=0;
```

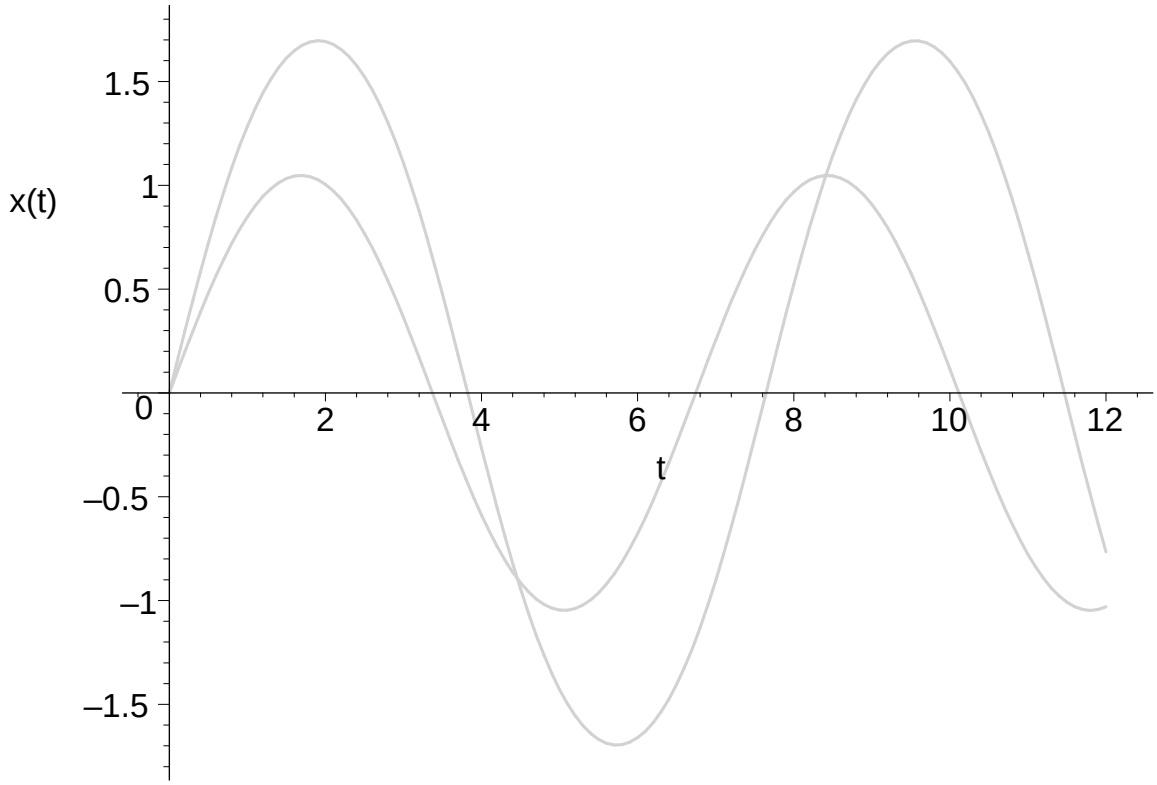
$$dgl := \left(\frac{\partial^2}{\partial t^2}\,x(t)\right) + \sin(x(t)) = 0$$

```
> dsolve(dgl);
```

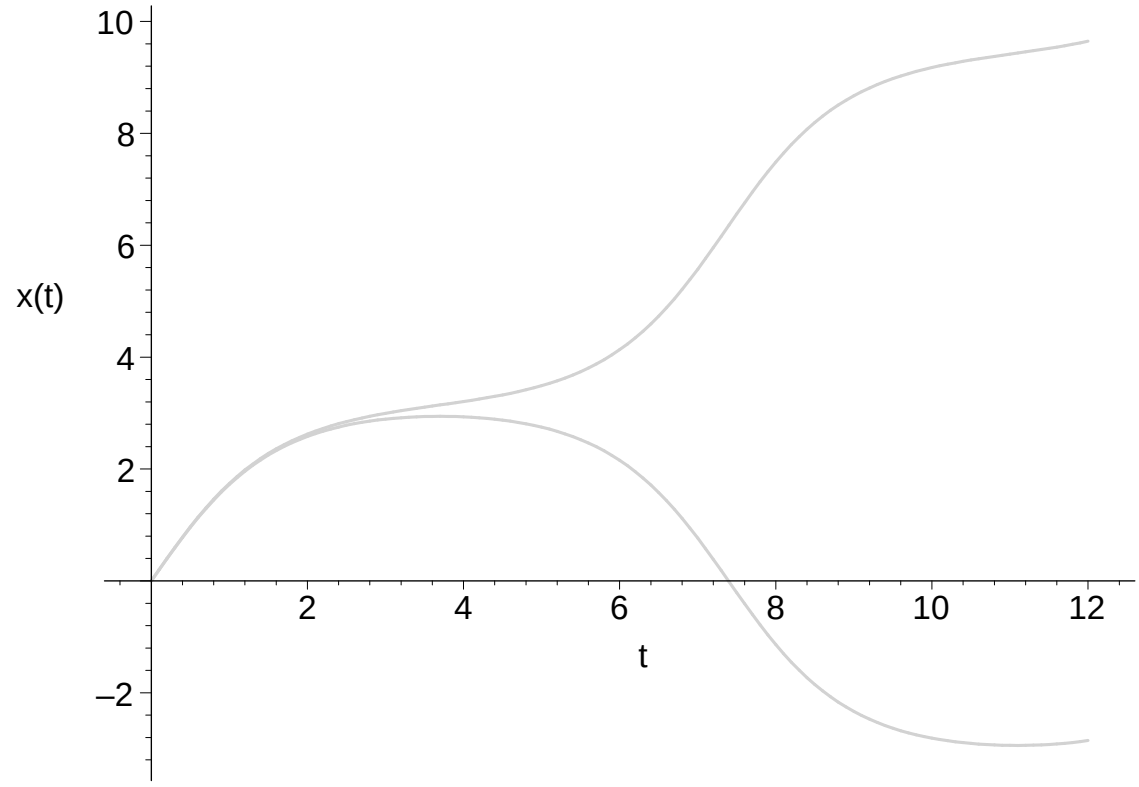
$$\int^{x(t)} -\frac{1}{\sqrt{2\cos(\_a)+\_C1}}\,d\_a - t - \_C2 = 0,$$

$$\int^{x(t)} \frac{1}{\sqrt{2\cos(\_a)+\_C1}}\,d\_a - t - \_C2 = 0$$

```
> DEplot(dgl,x(t),t=0..12,[[x(0)=0,D(x)(0)=1]
  ,[x(0)=0,D(x)(0)=1.5]],stepsize=0.1);
```




```
> DEplot(dgl,x(t),t=0..12,[[x(0)=0,D(x)(0)=2.
  01],[x(0)=0,D(x)(0)=1.99]],stepsize=0.1);
```




```
> dgl:=[diff(x(t),t)=x(t)*(a-b*y(t)),diff(y(t
  ),t)=y(t)*(-c+d*x(t))];
```

$$dgl := \left[\frac{\partial}{\partial t}\,\mathrm{x}(t) = \mathrm{x}(t)\,(a - b\,\mathrm{y}(t)),\ \frac{\partial}{\partial t}\,\mathrm{y}(t) = \mathrm{y}(t)\,(-c + d\,\mathrm{x}(t))\right]$$

```
> a:=3;b:=2;c:=2;d:=1;
```

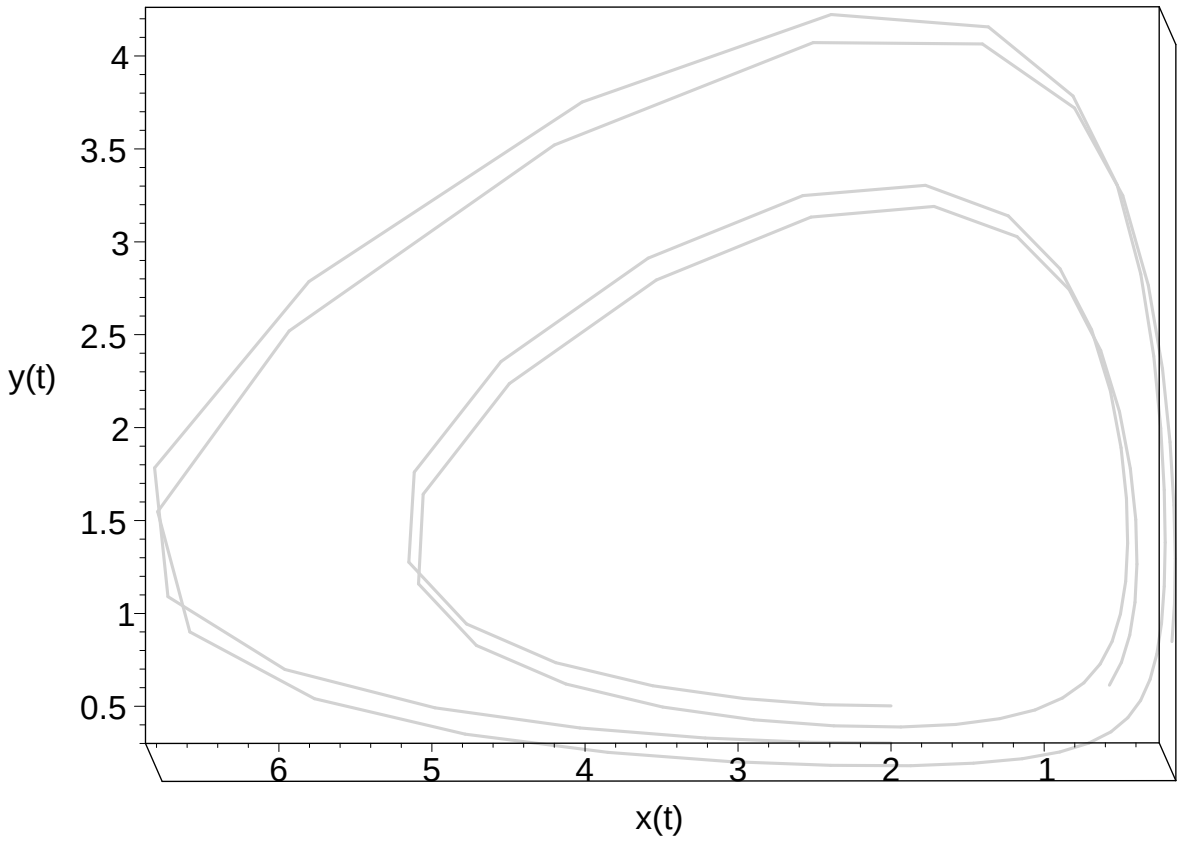
$$a := 3$$

$$b := 2$$

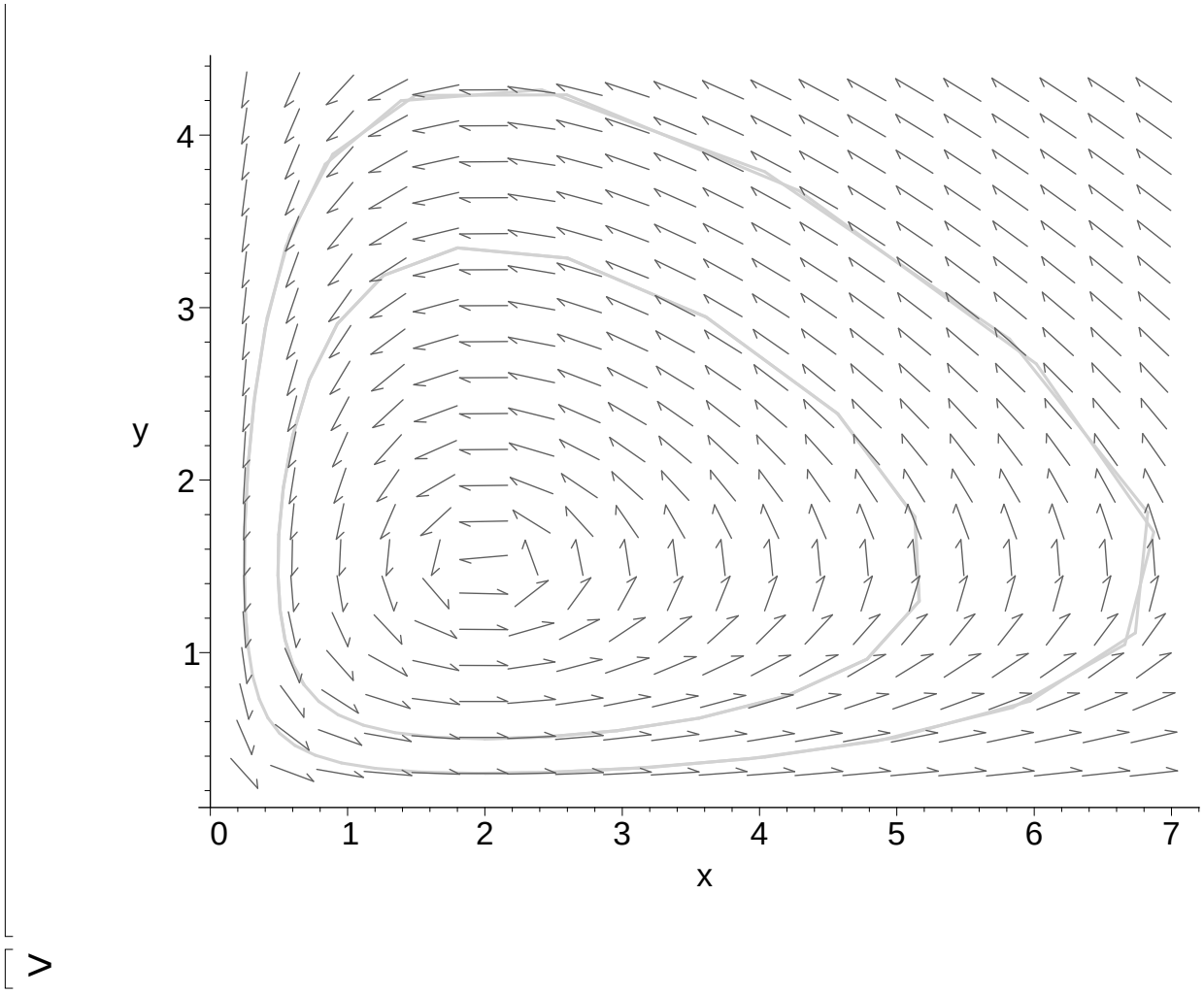
$$c := 2$$

$$d := 1$$

```
> DEplot3d(dgl,[x(t),y(t)],t=0..5,[[x(0)=2,y(
  0)=0.3],[x(0)=2,y(0)=0.5]],stepsize=0.1);
```




```
> DEplot(dgl,[x(t),y(t)],t=0..5,[[x(0)=2,y(0)
  =0.3],[x(0)=2,y(0)=0.5]],stepsize=0.1);
```


y
x
0
1
2
3
4
5
6
7
1
2
3
4

>