```
> dgl:=diff(y(x),x)=(-cos(x)+cos(sqrt(2)*x))*
  (exp(y(x)));
```

$$dgl := \frac{\partial}{\partial x} y(x) = (-\cos(x) + \cos(\sqrt{2}\, x))\, \mathbf{e}^{y(x)}$$

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

$$y(x) = \ln\left(2 \frac{1}{2\sin(x) - \sin(\sqrt{2}\, x)\sqrt{2} + \frac{2}{\mathbf{e}^{(-2)}}}\right)$$

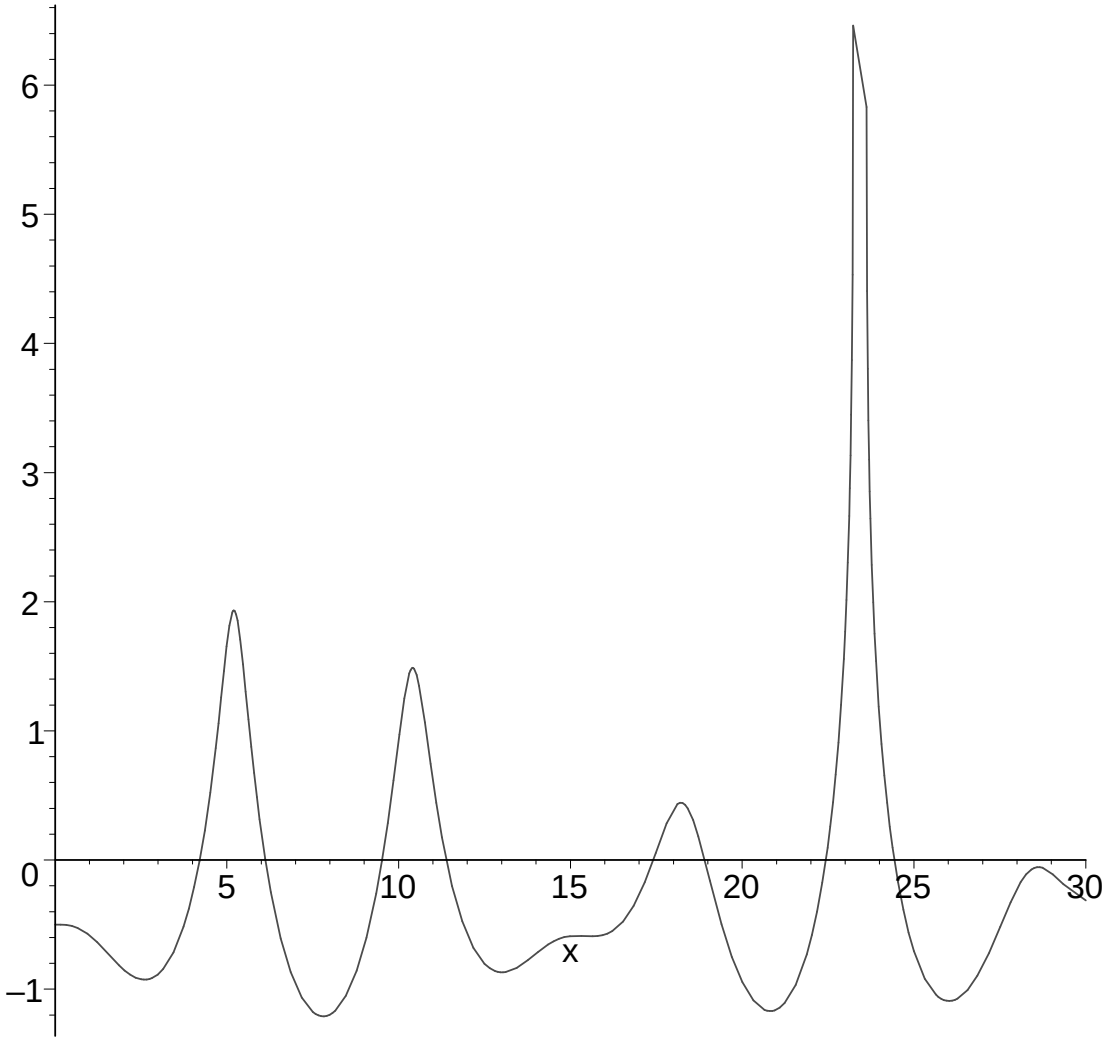
```
> dsolve({dgl,y(0)=-1/2},y(x));
```

$$y(x) = \ln\left(2 \frac{1}{2\sin(x) - \sin(\sqrt{2}\, x)\sqrt{2} + \frac{2}{\mathbf{e}^{(-1/2)}}}\right)$$

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

$$f := \ln\left(2 \frac{1}{2\sin(x) - \sin(\sqrt{2}\, x)\sqrt{2} + \frac{2}{\mathbf{e}^{(-1/2)}}}\right)$$

```
> plot(f,x=0..30);
```

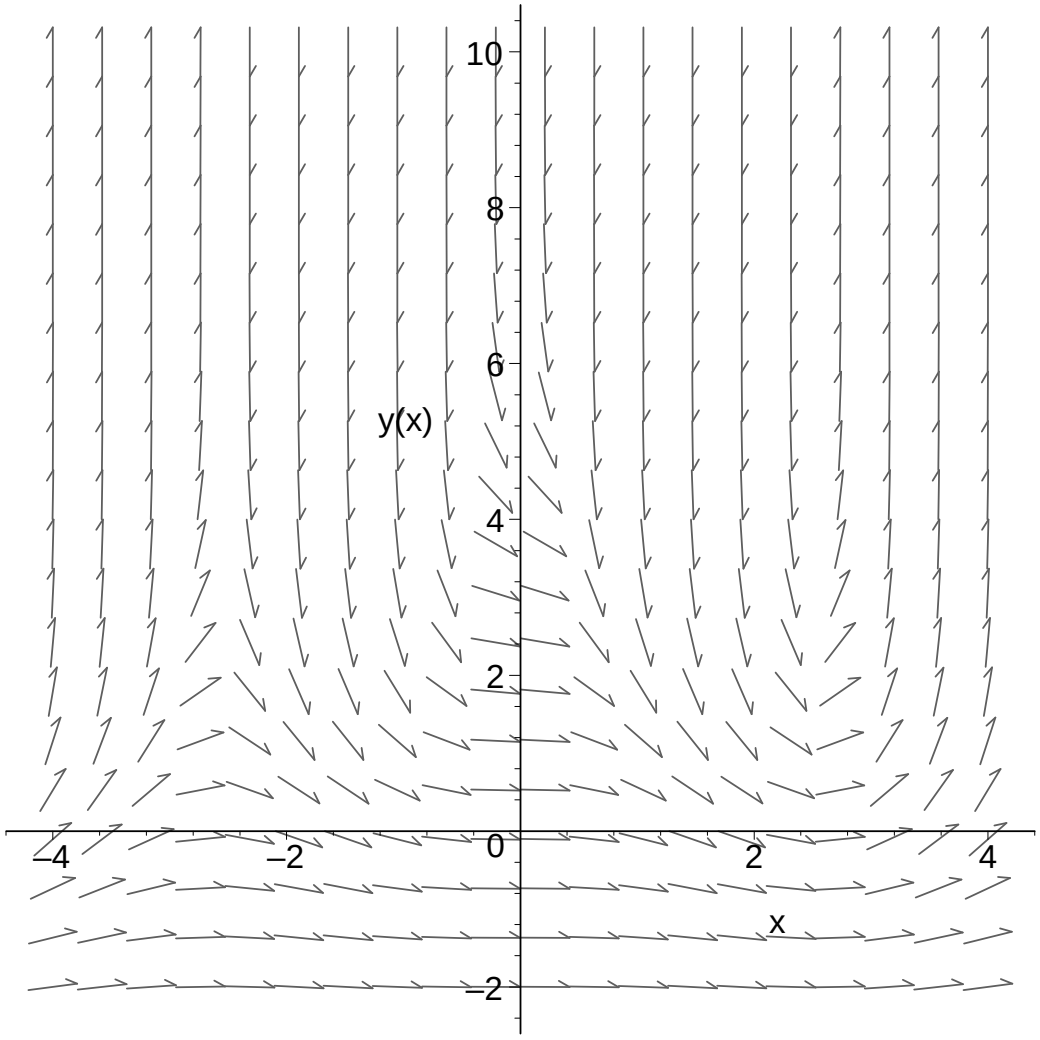



```
> with(DEtools);
```

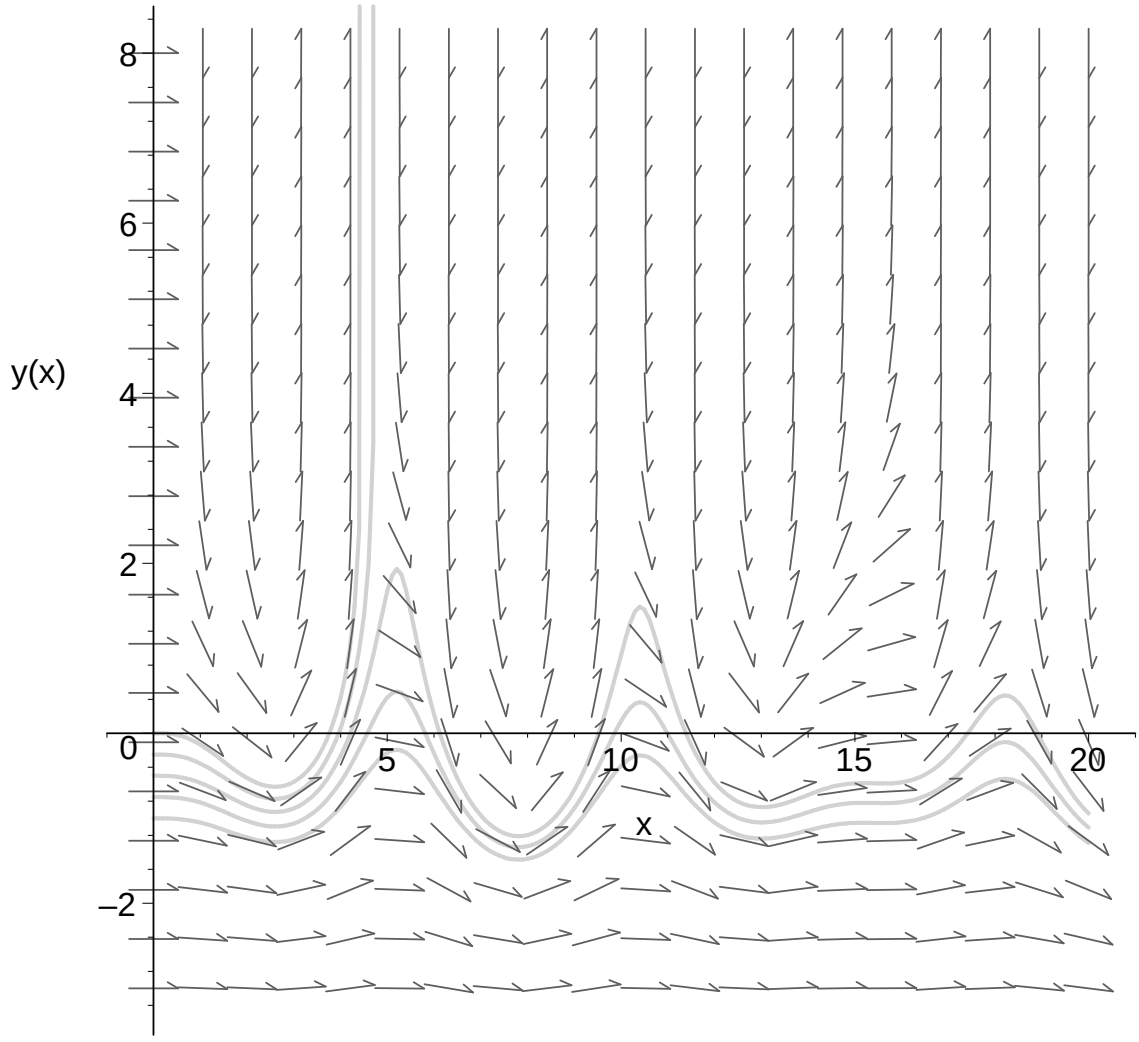
[*DEnormal*, *DEplot*, *DEplot3d*, *DEplot_polygon*, *DFactor*, *DFactorLCLM*, *DFactorsols*, *Dchangevar*, *GCRD*, *LCLM*, *MeijerGsols*, *PDEchangecoords*, *RiemannPsols*, *Xchange*, *Xcommutator*, *Xgauge*, *abelsol*, *adjoint*, *autonomous*, *bernoullisol*, *buildsol*, *buildsym*, *canoni*, *caseplot*, *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=-4..4,y=-2..10);
```




```
> DEplot(dgl,y(x),x=0..20,y=-3..8,[[y(0)=0],[
  y(0)=-0.25],[y(0)=-0.5],[y(0)=-1],[y(0)=-0.
  75]],'stepsize=0.1');
```




```
> dgl:=D(y)(x)=y(x)*(3+sin(x))-(2+cos(sqrt(x)
  ))*y(x)^2;
```

$$dgl := \mathrm{D}(y)(x) = \mathrm{y}(x)\,(3+\sin(x)) - (2+\cos(\sqrt{x}))\,\mathrm{y}(x)^2$$

```
> dsolve(dgl,y(x));
```

$$y(x) = \frac{\mathbf{e}^{(3x - \cos(x))}}{\int (2 + \cos(\sqrt{x}))\, \mathbf{e}^{(3x - \cos(x))}\, dx + \_C1}$$

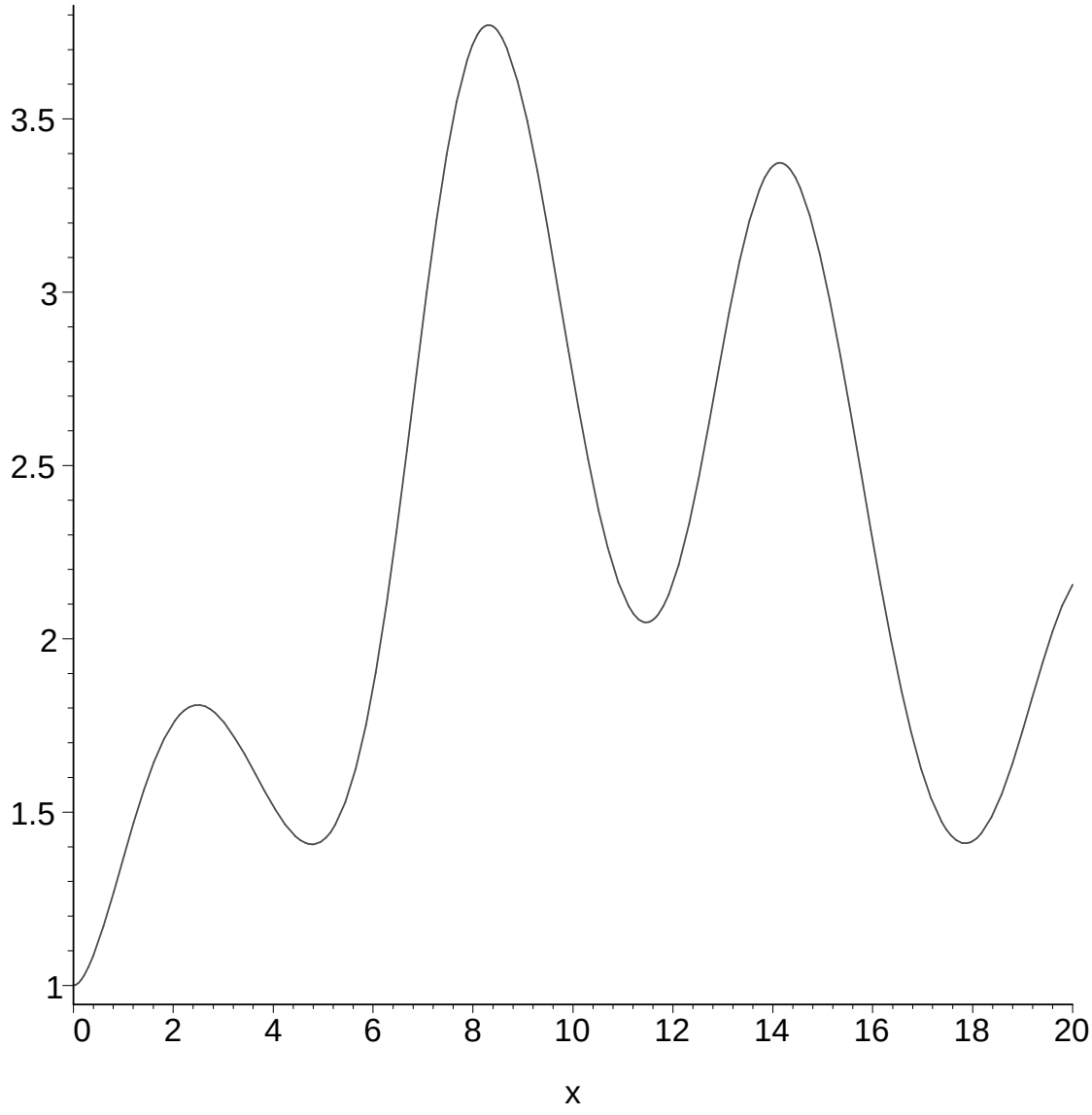
```
> dsolve({dgl,y(0)=1},y(x));
```

$$y(x) = \frac{\mathbf{e}^{(3x - \cos(x))}}{\int_0^x (2 + \cos(\sqrt{u}))\, \mathbf{e}^{(3u - \cos(u))}\, du + \cosh(1) - \sinh(1)}$$

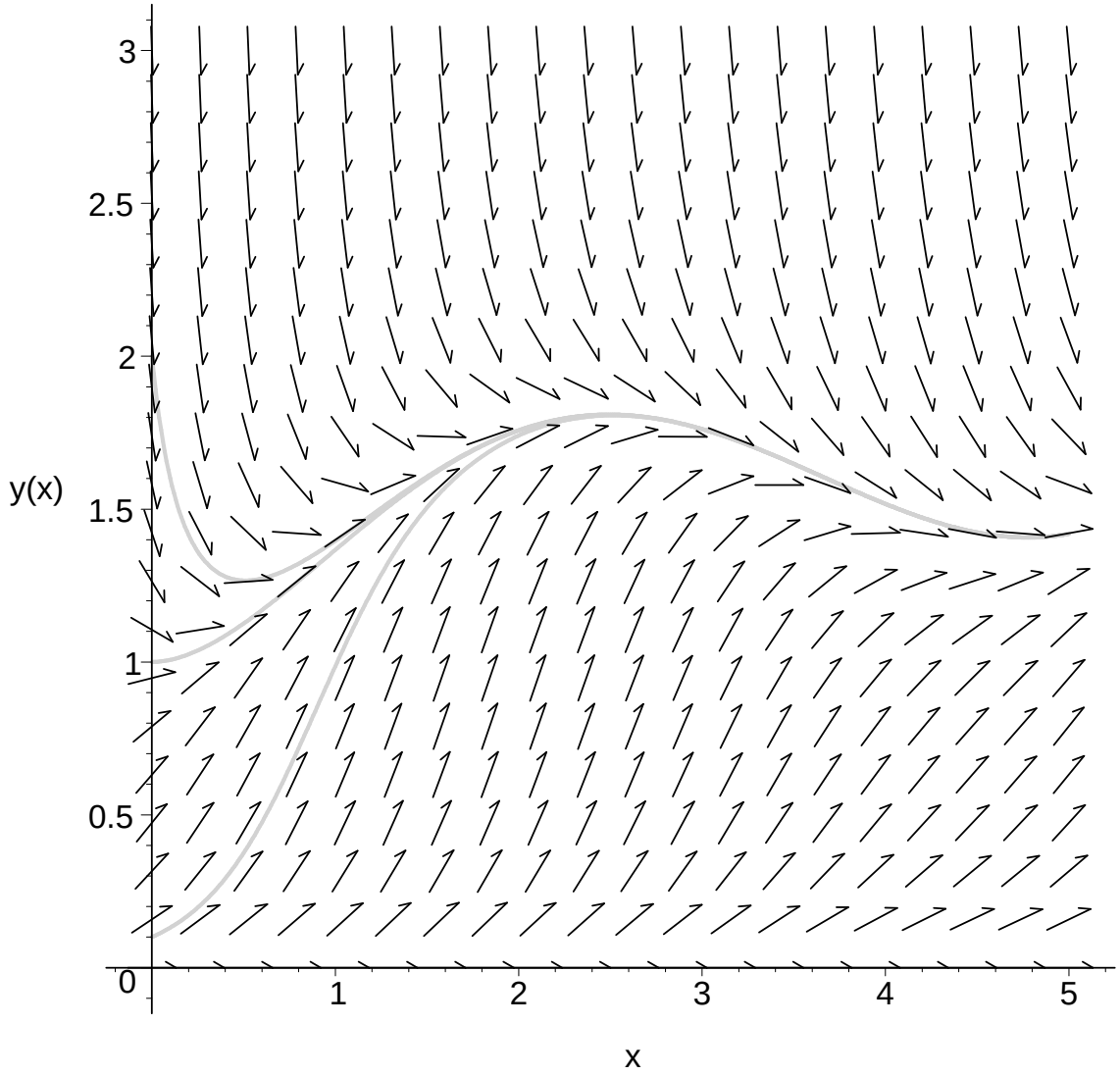
```
> f:=rhs(%);
```

$$f := \frac{\mathbf{e}^{(3x - \cos(x))}}{\int_0^x (2 + \cos(\sqrt{u}))\, \mathbf{e}^{(3u - \cos(u))}\, du + \cosh(1) - \sinh(1)}$$

```
> plot(f,x=0..20,numpoints=100);
```




```
> DEplot(dgl,y(x),x=0..5,y=0..3,[[y(0)=0.1],[
  y(0)=1],[y(0)=2]],'stepsize=0.01',color=bla
  ck);
```



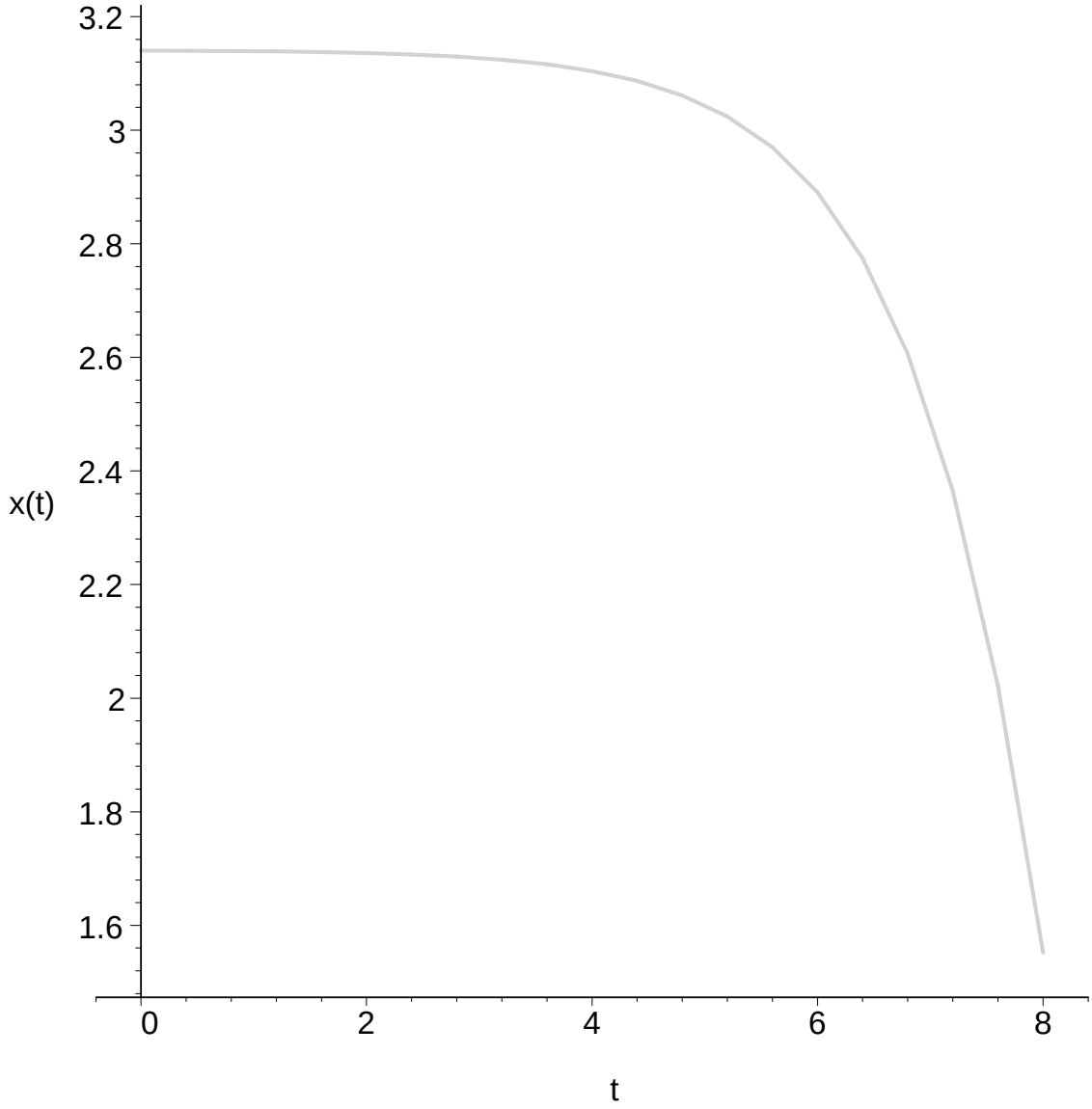

```
> 
> 
> 
```

```
> dgl:=diff(x(t),t,t)+1/10*diff(x(t),t)+sin(x
  (t))=0;
```

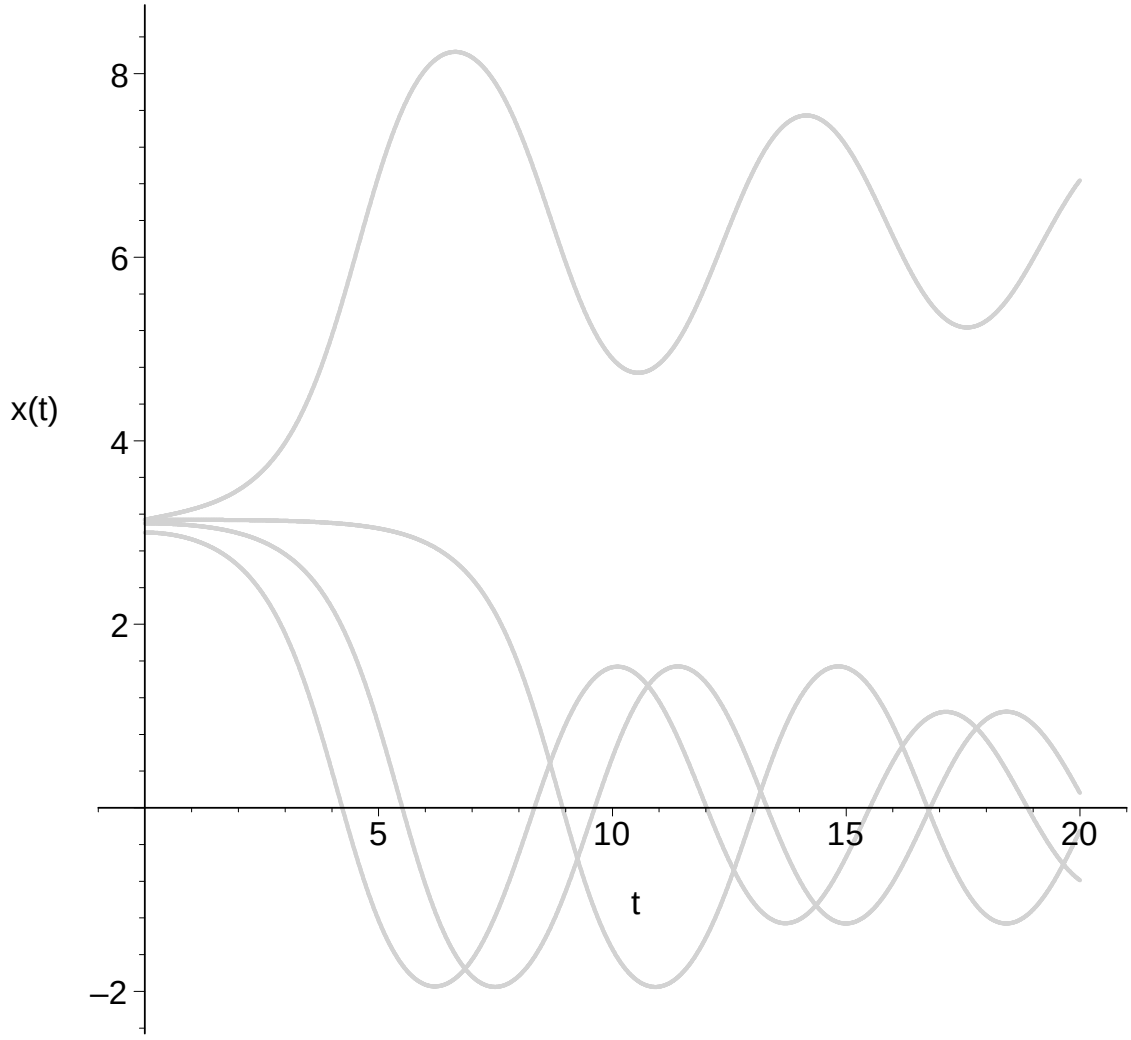
$$dgl := \left(\frac{\partial^2}{\partial t^2}\,\mathrm{x}(t)\right) + \frac{1}{10}\left(\frac{\partial}{\partial t}\,\mathrm{x}(t)\right) + \sin(\mathrm{x}(t)) = 0$$

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

```
> DEplot(dgl,x(t),t=0..8,[[x(0)=3.14,D(x)(0)=
  0]]);
```




```
> DEplot(dgl,x(t),t=0..20,[[x(0)=3,D(x)(0)=0]
  ,[x(0)=3.1,D(x)(0)=0],[x(0)=3.14,D(x)(0)=0]
  ,[x(0)=3.14,D(x)(0)=0.1]],'stepsize=0.01');
```




```
> a:=6;b:=5;c:=2;d:=3;
```

$$a := 6$$

$$b := 5$$

$$c := 2$$

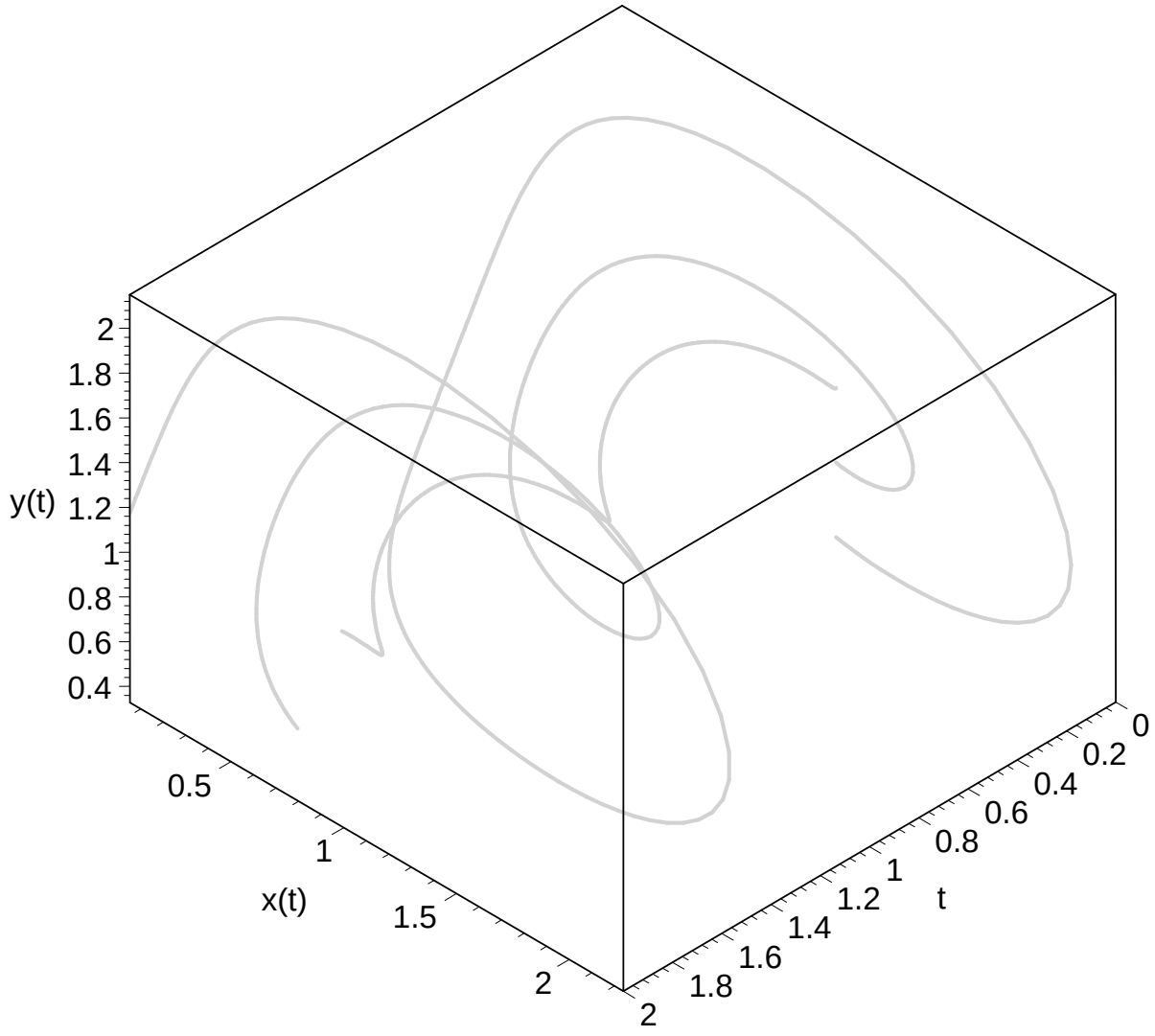
$$d := 3$$

```
> dgl:=[diff(x(t),t)=x(t)*(a-b*y(t)^2),diff(y
```

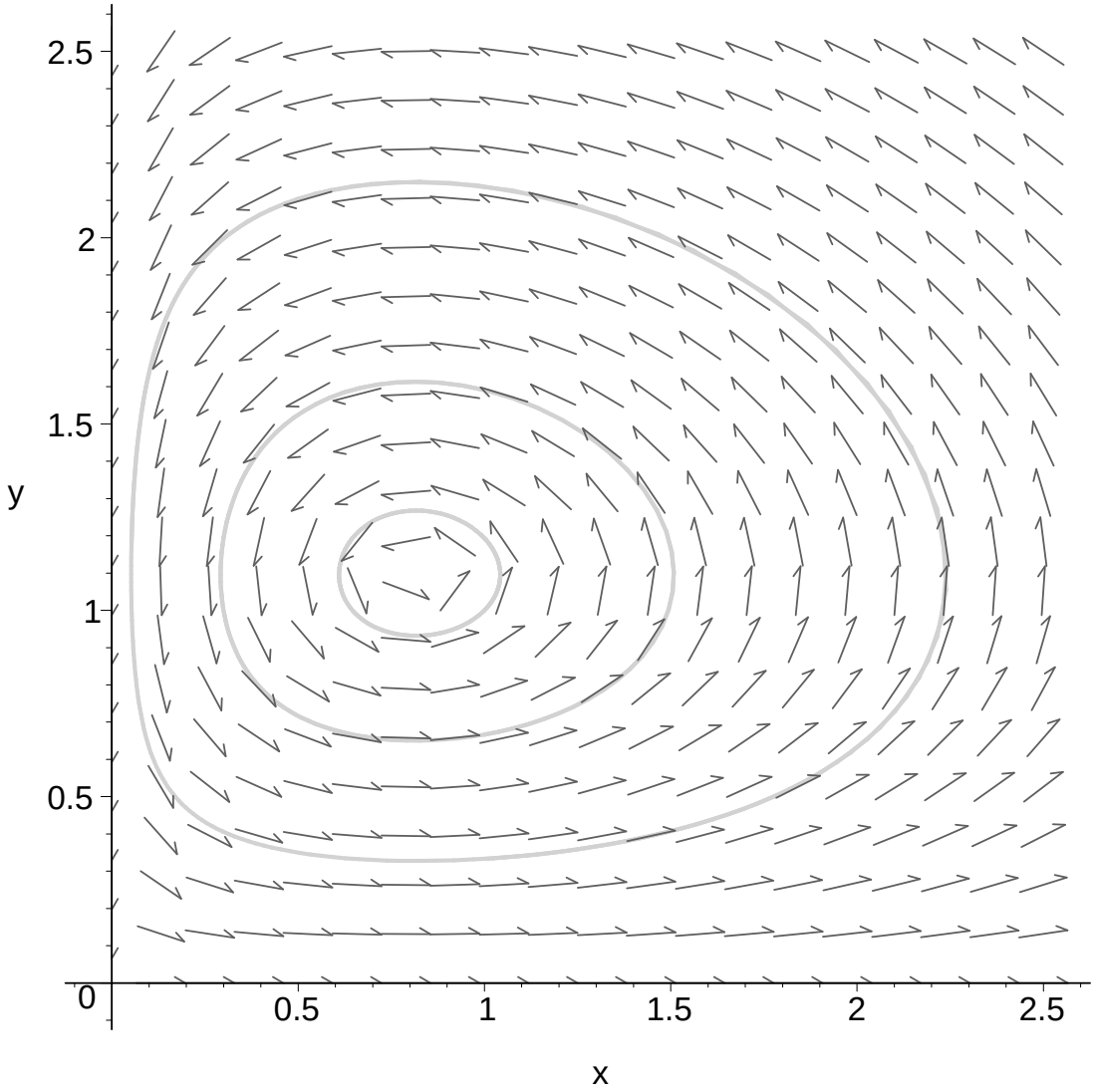
```
(t),t)=y(t)*(-c+d*x(t)^2)];
```

$$dgl := \left[\frac{\partial}{\partial t}\,\mathrm{x}(t) = \mathrm{x}(t)\,(6 - 5\,\mathrm{y}(t)^2),\ \frac{\partial}{\partial t}\,\mathrm{y}(t) = \mathrm{y}(t)\,(-2 + 3\,\mathrm{x}(t)^2)\right]$$

```
> DEplot3d(dgl,[x(t),y(t)],t=0..2,[[x(0)=1,y(
  0)=1/3],[x(0)=1,y(0)=2/3],[x(0)=1,y(0)=1]],
  stepsize=0.01);
```




```
> phaseportrait(dgl,[x(t),y(t)],t=0..2,[[x(0)
  =1,y(0)=1/3],[x(0)=1,y(0)=2/3],[x(0)=1,y(0)
  =1]],x=0..2.5,y=0..2.5,'stepsize=0.01');
```




```
> a:=6;b:=5;c:=-2;d:=3;
> dgl:=[diff(x(t),t)=x(t)*(a-b*y(t)^2),diff(y
  (t),t)=y(t)*(-c+d*x(t)^2)];
>
```

$$a := 6$$

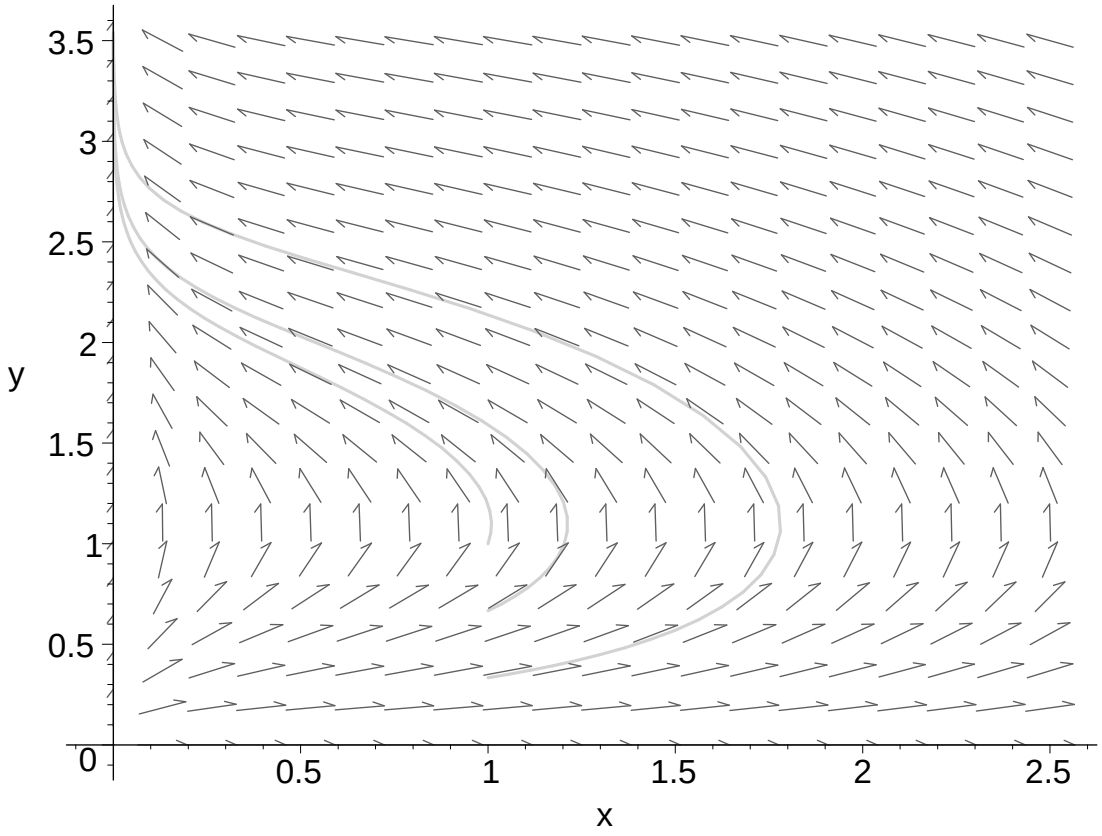
$$b := 5$$

$$c := -2$$

$$d := 3$$

$$dgl := \left[\frac{\partial}{\partial t}\,\mathrm{x}(t) = \mathrm{x}(t)\,(6 - 5\,\mathrm{y}(t)^2), \frac{\partial}{\partial t}\,\mathrm{y}(t) = \mathrm{y}(t)\,(2 + 3\,\mathrm{x}(t)^2)\right]$$

```
> phaseportrait(dgl,[x(t),y(t)],t=0..2,[[x(0)
  =1,y(0)=1/3],[x(0)=1,y(0)=2/3],[x(0)=1,y(0)
  =1]],x=0..2.5,y=0..3.5,'stepsize=0.01');
```




```
> 
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