Exemplo 1

$$\frac{dy}{dt} + \frac{1}{2} y = \frac{1}{2} E^{t/3}$$

(Debug) In[ ]:= `sol = DSolve[y'[x] == .5 E^(x/3) - .5 y[x], y[x], x]`

(Debug) Out[ ]= $\{\{y[x] \to 0.6\, e^{0.333333\, x} + e^{-0.5\, x}\, C[1]\}\}$

(Debug) In[ ]:= `c1solve = Solve[y == sol[[1, 1, 2]], C[1]]`

(Debug) Out[ ]= $\{\{C[1] \to -1.\, e^{0.5\, x}\, (0.6\, e^{0.333333\, x} - 1.\, y)\}\}$

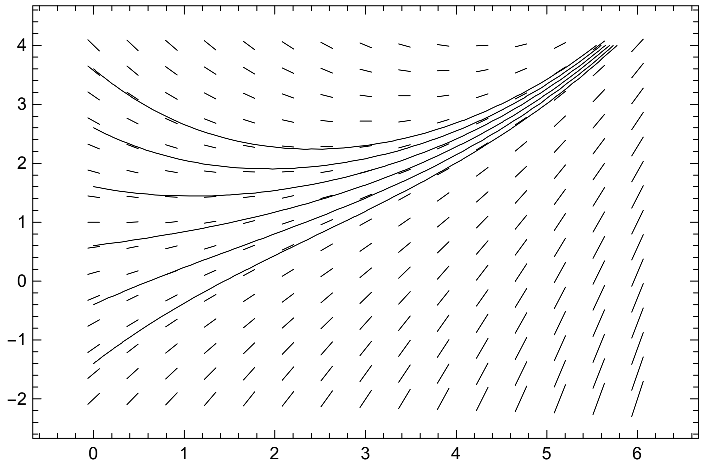
(Debug) In[ ]:= `g[x_, y_] := c1solve[[1, 1, 2]]`

(Debug) In[ ]:=
```
vectorEx1 = VectorPlot[{1, .5 E^(x/3) - .5 y}, {x, 0, 6}, {y, -2, 4},
    VectorStyle → {Thin, Black, Arrowheads[0]}, AspectRatio → .65];
```

(Debug) In[ ]:=
```
listaConstantes = Table[ContourPlot[g[0, 1] == κ, {x, 0, 6}, {y, -2, 4},
    ContourShading → False, ContourStyle → {Thin, Black}], {κ, -2, 3, 1}];
```

(Debug) In[ ]:= `Show[vectorEx1, listaConstantes]`

(Debug) Out[ ]=



Exemplo 2

$$\frac{dy}{dt} - 2y = 4 - t$$

(Debug) In[ ]:= `sol2 = DSolve[y'[x] - 2 y[x] == 4 - x, y[x], x]`

(Debug) Out[ ]= $\{\{y[x] \to -\frac{7}{4} + \frac{x}{2} + e^{2x}\, C[1]\}\}$

(Debug) In[ ]:= `c1solve2 = Solve[y == sol2[[1, 1, 2]], C[1]]`

(Debug) Out[ ]= $\{\{C[1] \to -\frac{1}{4}\, e^{-2x}\, (-7 + 2x - 4y)\}\}$

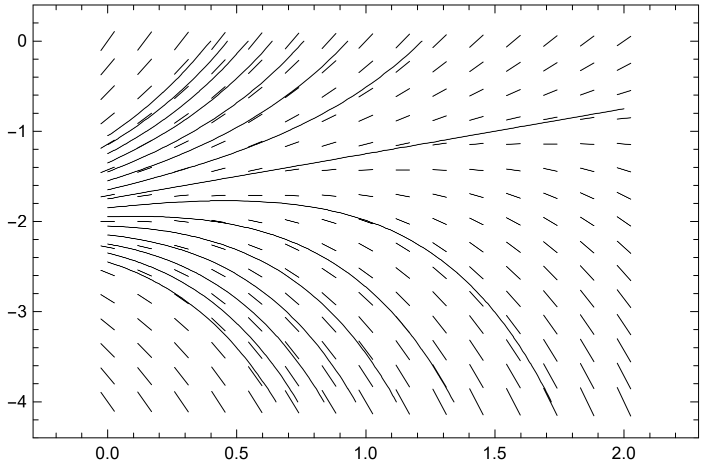
(Debug) In[ ]:= `h[x_, y_] := c1solve2[[1, 1, 2]]`

(Debug) In[ ]:=
```
vectorEx2 = VectorPlot[{1, 4 - x + 2 y}, {x, 0, 2}, {y, -4, 0},
    VectorStyle → {Thin, Black, Arrowheads[0]}, AspectRatio → .65];
```

(Debug) In[ ]:=
```
listaConstantes2 = Table[ContourPlot[h[x, y] == κ, {x, 0, 2}, {y, -4, 0},
    ContourShading → False, ContourStyle → {Thin, Black}], {κ, -.7, .7, .1}];
```

(Debug) In[ ]:=
```
Show[vectorEx2, listaConstantes2]
```

(Debug) Out[ ]=



Exemplo 3

PVI: t y' + 2 y = 4 t^2, y(1) = 2

(Debug) In[ ]:=
```
Solve[t y' + 2 y == 4 t^2, y']
```

(Debug) Out[ ]= $\left\{\left\{y' \to \frac{2\left(2 t^2 - y\right)}{t}\right\}\right\}$

(Debug) In[ ]:=
```
sol3 = DSolve[x y'[x] + 2 y[x] == 4 x^2, y[x], x]
```

(Debug) Out[ ]= $\left\{\left\{y[x] \to x^2 + \frac{C[1]}{x^2}\right\}\right\}$

(Debug) In[ ]:=
```
c1solve3 = Solve[y == sol3[[1, 1, 2]], C[1]]
```

(Debug) Out[ ]= $\left\{\left\{C[1] \to -x^2 \left(x^2 - y\right)\right\}\right\}$

(Debug) In[ ]:=
```
i[x_, y_] = c1solve3[[1, 1, 2]];
```

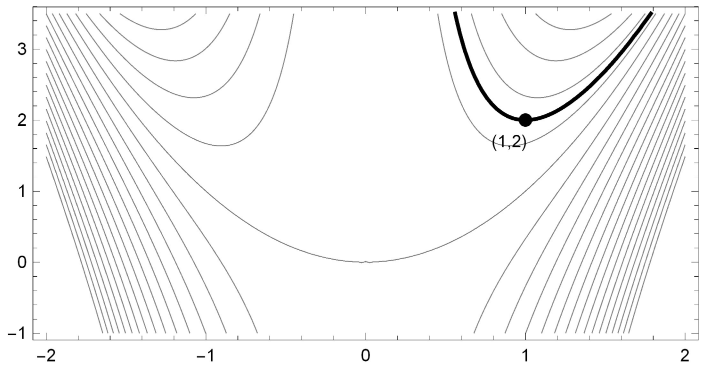
(Debug) In[ ]:=
```
contornosI = ContourPlot[i[x, y], {x, -2, 2}, {y, -1, 3.5},
   ContourShading → False, Contours → 20, PlotPoints → 50, AspectRatio → 1 / 2];
```

(Debug) In[ ]:=
```
contorno12 =
  ContourPlot[i[x, y] == 1, {x, 0, 2}, {y, -1, 3.5}, ContourStyle → {Thick, Black}];
```

(Debug) In[ ]:=
```
ponto = Graphics[{PointSize[Large], Black, Point[{1, 2}]}];
```

(Debug) In[ ]:=
```
Show[contornosI, contorno12, ponto, Graphics[Text["(1,2)", {.9, 1.7}]]]
```

(Debug) Out[ ]=



Exemplo 4

PVI: 2 y' + t y = 2, y(0) = 1

(Debug) In[ ]:=
```
sol4 = DSolve[2 y'[x] + x y[x] == 2, y[x], x]
```

(Debug) Out[ ]= $\left\{\left\{y[x] \to e^{-\frac{x^2}{4}} C[1] + e^{-\frac{x^2}{4}} \sqrt{\pi} \text{ Erfi}\left[\frac{x}{2}\right]\right\}\right\}$

(Debug) In[ ]:=
```
c1solve4 = Solve[y == sol4[[1, 1, 2]], C[1]]
```

(Debug) Out[ ]= $\left\{\left\{C[1] \to e^{\frac{x^2}{4}} y - \sqrt{\pi} \text{ Erfi}\left[\frac{x}{2}\right]\right\}\right\}$

(Debug) In[ ]:=
```
j[x_, y_] = c1solve4[[1, 1, 2]];
```

(Debug) In[ ]:=
```
contornosJ = Table[ContourPlot[j[x, y] == λ,
    {x, 0, 6}, {y, -3, 3}, ContourShading → False, PlotPoints → 60,
    AspectRatio → .65, ContourStyle → {Thin, Black}], {λ, -3, 2.5, .5}];
```

(Debug) In[ ]:=
```
j[0, 1]
```

(Debug) Out[ ]= 1

(Debug) In[ ]:=
```
Show[contornosJ,
 ContourPlot[j[x, y] == 1, {x, 0, 6}, {y, -3, 3}, ContourStyle → {Black, Thick}]]
```

(Debug) Out[ ]=