(Debug) In[153]:=
```
(* Exercício 16 pg. 365 *)
```

(Debug) In[154]:=
```
(* dy/dx == x/y, y[3] = 5 *)
```

(Debug) In[155]:=
```
h[x_, y_] = {y, x};
```

(Debug) In[156]:=
$$\text{DSolve}\left[y'[x] == \frac{x}{y[x]}, y[x], x\right]$$

(Debug) Out[156]=
$$\left\{\left\{y[x] \to x^{1/3}\right\}, \left\{y[x] \to -(-1)^{1/3} x^{1/3}\right\}, \left\{y[x] \to (-1)^{2/3} x^{1/3}\right\}\right\}$$

(Debug) In[157]:=
```
(* Resolvendo na mão
   y dy == x dx
        y^2/2 = x^2/2 + C[1]
              C[1] = y^2/2 - x^2/2
*)
```

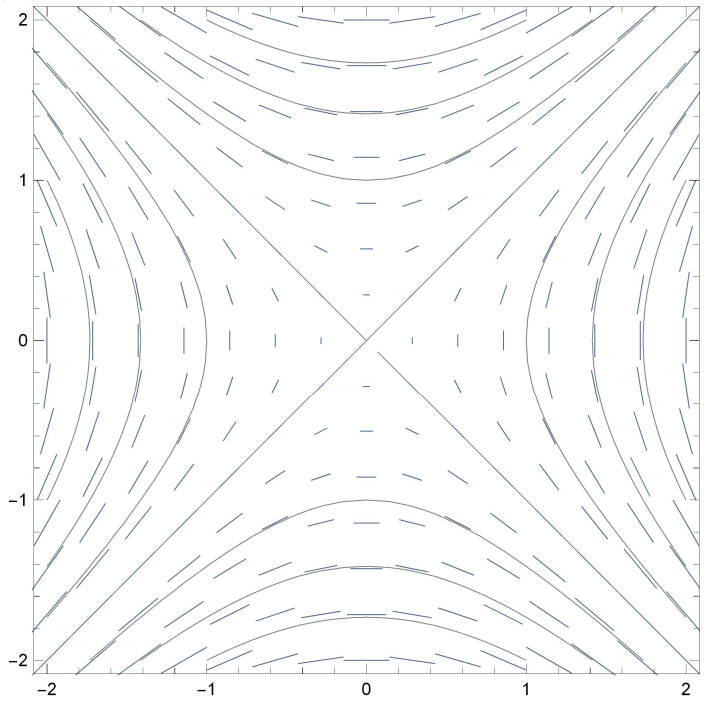
(Debug) In[158]:=
$$\beta[x\_, y\_] = \frac{y^2}{2} - \frac{x^2}{2};$$

(Debug) In[159]:=
```
contornos0 = ContourPlot[β[x, y], {x, -2, 2}, {y, -2, 2}, ContourShading → False];
```

(Debug) In[160]:=
```
stream0 = VectorPlot[h[x, y], {x, -2, 2}, {y, -2, 2}, VectorStyle → {Arrowheads[0]}];
```

(Debug) In[161]:=
```
Show[contornos0, stream0]
```

(Debug) Out[161]=



(Debug) In[162]:=
$$\text{DSolve}\left[y'[x] == \frac{x}{y[x]}, y[x], x\right]$$

(Debug) Out[162]=
$$\left\{\left\{y[x] \to x^{1/3}\right\}, \left\{y[x] \to -(-1)^{1/3} x^{1/3}\right\}, \left\{y[x] \to (-1)^{2/3} x^{1/3}\right\}\right\}$$

(Debug) In[163]:=
```
(* Exemplo 2 pg. 361 *)
```

(Debug) In[164]:= `(* dy/dx = Sqrt[x y] *)`

(Debug) In[165]:= `(* dy = Sqrt[x y] dx*)`

(Debug) In[166]:= `(* dy = Sqrt[x] Sqrt[y] dx*)`

(Debug) In[167]:= `(* Depois de integrar e obter y[x] *)`

(Debug) In[168]:= `(* y = (1/3 x^(3/2) + 1/2 C[1])^2 *)`

(Debug) In[169]:=
```
Solve[y == (1/3 x^(3/2) + 1/2 C[1])^2, C[1]]
```

(Debug) Out[169]=

$$\left\{\left\{C[1] \to -\frac{2}{3}\left(x^{3/2} - 3\sqrt{y}\right)\right\}, \left\{C[1] \to -\frac{2}{3}\left(x^{3/2} + 3\sqrt{y}\right)\right\}\right\}$$

(Debug) In[170]:=
```
contornos[x_, y_] := 2 y^.5 - 2/3 x^(3/2);
```

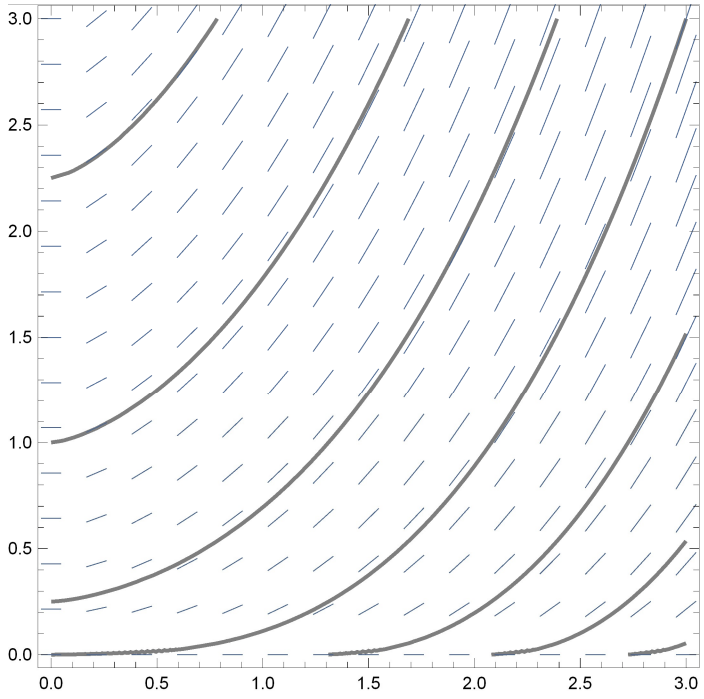
(Debug) In[171]:=
```
a = ContourPlot[contornos[x, y], {x, 0, 3},
    {y, 0, 3}, ContourShading → False, ContourStyle → {Thick}];
```

(Debug) In[172]:=
```
ω[x_, y_] := {1, Sqrt[x y]}
```

(Debug) In[173]:=
```
b = VectorPlot[ω[x, y], {x, 0, 3}, {y, 0, 3}, VectorStyle → Arrowheads[0]];
```

(Debug) In[174]:=
```
Show[a, b]
```

(Debug) Out[174]=



(Debug) In[175]:= `(* Apenas as duas soluções *)`

(Debug) In[176]:= `(* p1 = {0, 1} e p2 = {2, 2} *)`

(Debug) In[177]:=
```
p1 = {0, 1};
```

(Debug) In[178]:=
```
p2 = {2, 2};
```

(Debug) In[179]:=
```
contornos[0, 1]
```
(Debug) Out[179]=
```
2.
```

(Debug) In[180]:=
```
contornos[2, 2]
```
(Debug) Out[180]=
```
0.942809
```

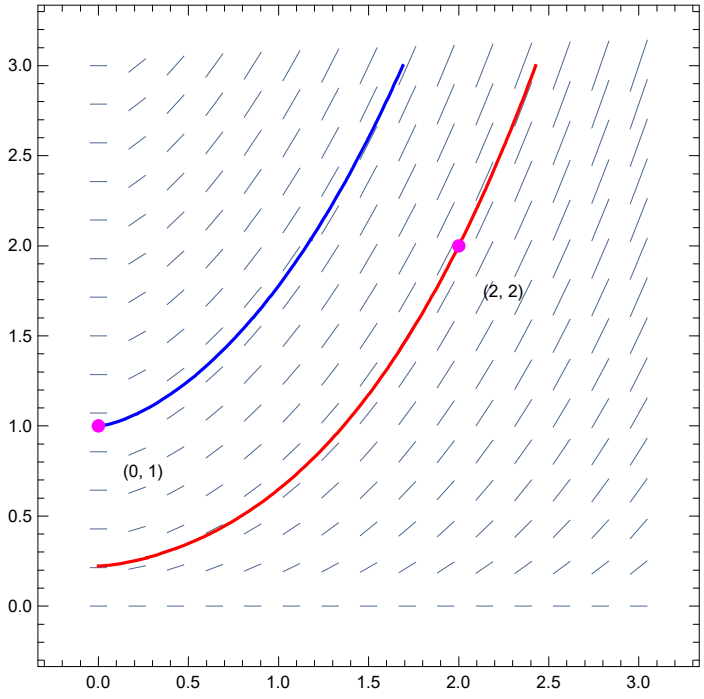
(Debug) In[181]:=
```
duasSols = ContourPlot[{contornos[x, y] == 2, contornos[x, y] == 0.9428090415820636`},
    {x, 0, 3}, {y, 0, 3}, ContourStyle → {Blue, Red}];
```

(Debug) In[182]:=
```
doisPontos = Graphics[{PointSize[Large], Magenta, Point[{p1, p2}]}];
```

(Debug) In[183]:=
```
r1 = Graphics[Text["(0, 1)", {.25, .75}]];
```

(Debug) In[184]:=
```
r2 = Graphics[Text["(2, 2)", {2.25, 1.75}]];
```

(Debug) In[185]:=
```
Show[b, duasSols, doisPontos, r1, r2]
```
(Debug) Out[185]=



(Debug) In[186]:=
```
Show[StreamPlot[{x, y}, {x, -1, 1},
  {y, -1, 1}, StreamStyle → {RGBColor[0.35, 0.81, 0.5]}],
 VectorPlot[{x, y}, {x, -1, 1}, {y, -1, 1}]]
```

(Debug) Out[186]=