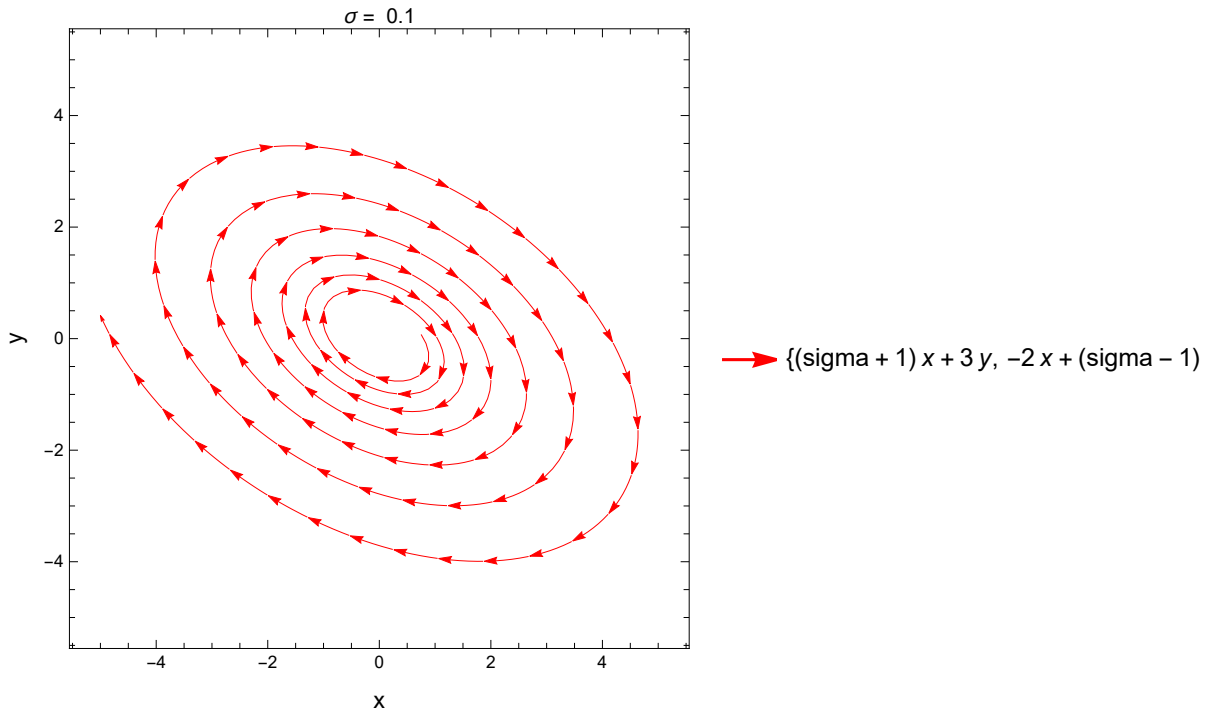
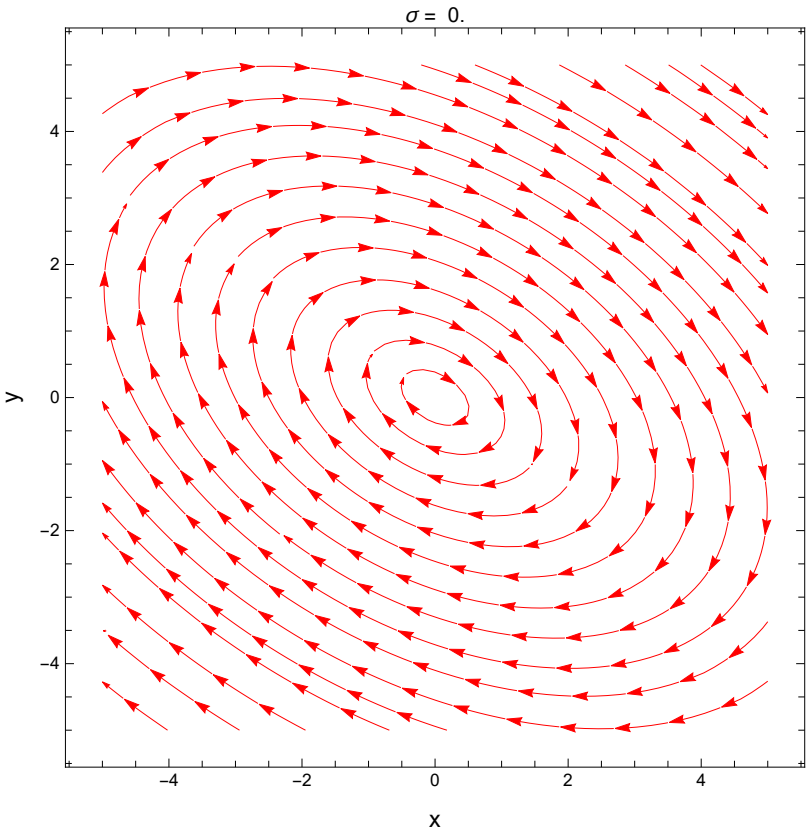
In[689]:=
```
Clear[x, y, sigma, t, u, v];
sol = DSolve[{x'[t] == (sigma + 1) * x[t] + 3 * y[t],
    y'[t] == -2 * x[t] + (sigma - 1) * y[t], x[0] == u, y[0] == v}, {x, y}, t];
x[t_] = x[t] /. sol;
y[t_] = y[t] /. sol;

sigma0 = 1 / 10;
StreamPlot[{(sigma + 1) * x + 3 y, -2 x + (sigma - 1) y} /. {sigma → sigma0},
 {x, -5, 5}, {y, -5, 5}, PlotTheme → "Detailed", StreamStyle → {Red},
 PlotLabel → StringJoin["σ = ", ToString[N[sigma0]]],
 StreamPoints → {{{1, 2}, Red}},
 FrameLabel → {Style["x", Black, Medium], Style["y", Black, Medium]}]

sigma0 = 0;
StreamPlot[{(sigma + 1) * x + 3 y, -2 x + (sigma - 1) y} /. {sigma → sigma0},
 {x, -5, 5}, {y, -5, 5}, PlotTheme → "Sparse", StreamStyle → {Red},
 PlotLabel → StringJoin["σ = ", ToString[N[sigma0]]],
 FrameLabel → {Style["x", Black, Medium], Style["y", Black, Medium]}]

sigma0 = -1 / 10;
StreamPlot[{(sigma + 1) * x + 3 y, -2 x + (sigma - 1) y} /. {sigma → sigma0},
 {x, -5, 5}, {y, -5, 5}, PlotTheme → "Detailed", StreamStyle → {Red},
 PlotLabel → StringJoin["σ = ", ToString[N[sigma0]]],
 StreamPoints → {{{1, 2}, Red}},
 FrameLabel → {Style["x", Black, Medium], Style["y", Black, Medium]}]
```

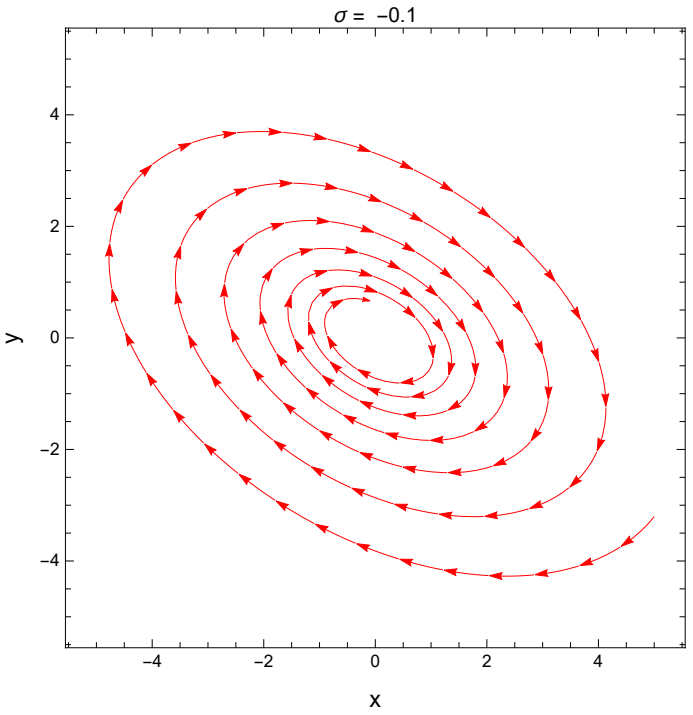
Out[694]=



Out[696]=



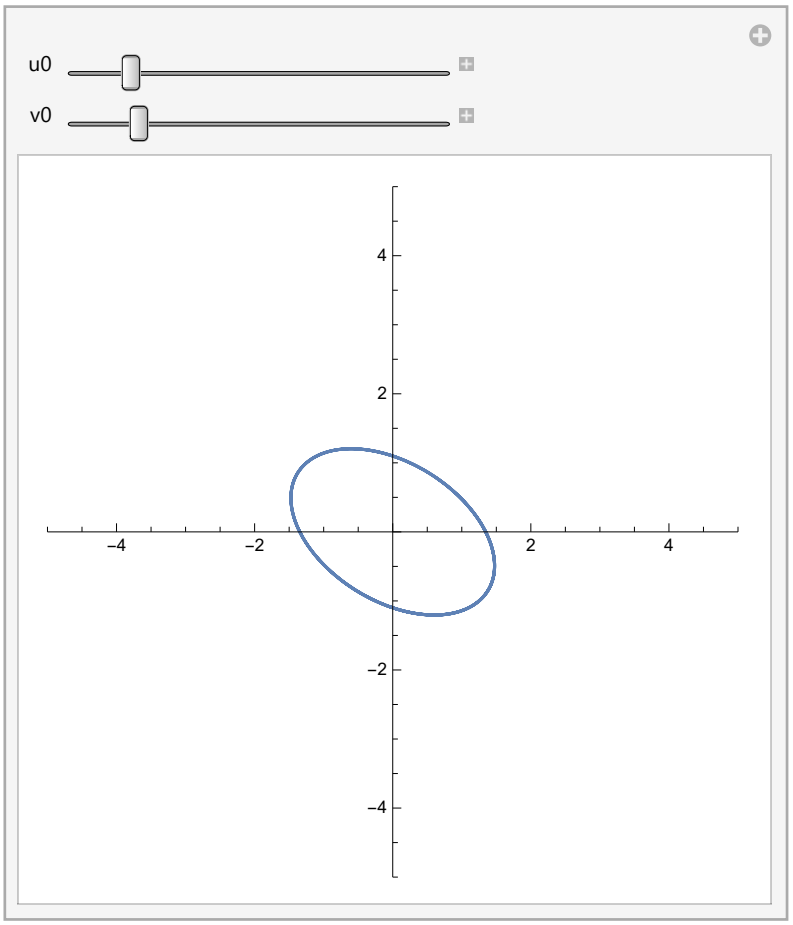
Out[698]=



→ {(sigma + 1) x + 3 y, −2 x + (sigma − 1)

In[699]:=
```
x[t_] = x[t] /. {sigma → 0};
y[t_] = y[t] /. {sigma → 0};
Manipulate[ParametricPlot[{x[t], y[t]} /. { u → u0, v → v0},
  {t, 0, 10}, PlotRange → {{-5, 5}, {-5, 5}}], {u0, 0, 5}, {v0, 0, 5}]
```

Out[701]=



In[702]:=
```
u0 = 1;
v0 = 1;
f[t_] = x[t] /. {sigma → 0, u → u0, v → v0};
g[t_] = y[t] /. {sigma → 0, u → u0, v → v0};
FullSimplify[
    Maximize[Sqrt[f[t]^2 + g[t]^2], t] / Minimize[Sqrt[f[t]^2 + g[t]^2], t]] :

   nm = FullSimplify[Maximize[Sqrt[f[t]^2 + g[t]^2], t]];
t0 = t /. Last[nm];
v = {f[t0], g[t0]};
```

In[706]:=
```
b = FullSimplify[v];
b = {b[[1]][[1]], b[[2]][[1]]};
c = Normalize[-b];
Simplify[c]
```

Out[709]= $\left\{-\frac{v}{\sqrt{2}\ \text{Abs}[v]}, -\frac{v}{\sqrt{2}\ \text{Abs}[v]}\right\}$