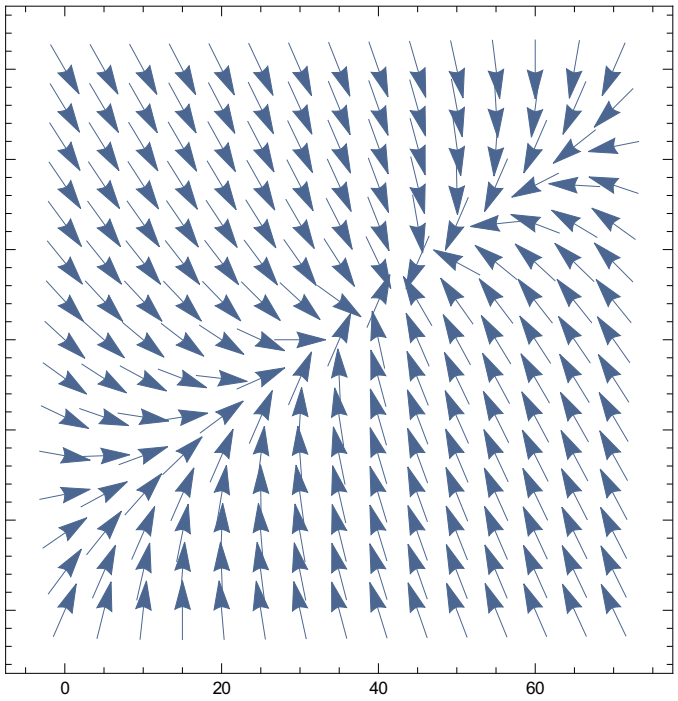
Brannon and Boyce 3.2.30

The Direction Field

In[2]:=
```
df = VectorPlot[{-0.1 x + 0.075 y + 1.5, 0.1 x - 0.2 y + 3} /
    Norm[{-0.1 x + 0.075 y + 1.5, 0.1 x - 0.2 y + 3}], {x, 0, 70}, {y, 0, 60}]
```

Out[2]=



Equilibrium Point : (42, 36)

Numerical Solutions

In[8]:=
```
soln[xzero_?NumericQ, yzero_?NumericQ] :=
 NDSolve[{dx'[t] == -0.1 dx[t] + 0.075 dy[t] + 1.5, dy'[t] == 0.1 dx[t] - 0.2 dy[t] + 3,
   dx[0] == xzero, dy[0] == yzero}, {dx, dy}, {t, 0, 100}]
```

In[9]:=
```
xx[t_?NumericQ, xzero_?NumericQ, yzero_?NumericQ] :=
 dx[t] /. soln[xzero, yzero][[1]]
yy[t_?NumericQ, xzero_?NumericQ, yzero_?NumericQ] := dy[t] /. soln[xzero, yzero][[1]]
```

In[13]:=
```
orbit1 =
  ParametricPlot[{xx[s, 55, 36], yy[s, 55, 36]}, {s, 0, 100}, PlotStyle → {Thick, Red}];
```

In[14]:=
```
Show[df, orbit1]
```

Out[14]=