

In[4913]:=

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miny = -1;
maxy = 1;
xrangelength = maxy - miny;

step = 0.2;

sigma = 1;

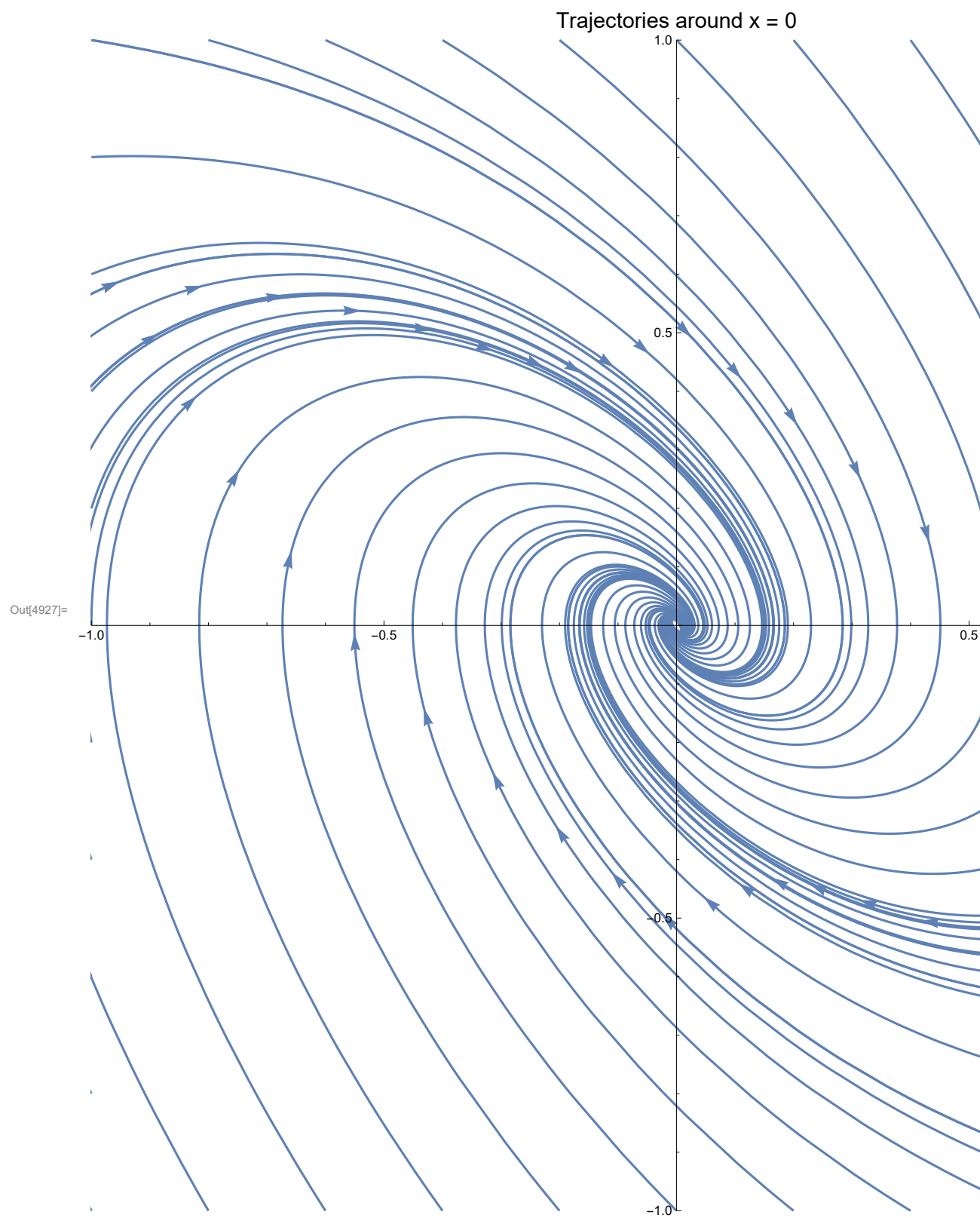
x0 = 0;
minx = x0 - xrangelength/2;
maxx = x0 + xrangelength/2;

sol[u_, v_] := NDSolve[
  {x'[t] == y[t], y'[t] == -Sin[x[t]] - sigma * y[t], x[0] == u, y[0] == v}, {x, y}, {t, 10}]

Table1 = Table[{minx, y}, {y, miny, maxy, step}];
Table2 = Table[{x, maxy}, {x, minx, maxx, step}];
Table3 = Table[{maxx, y}, {y, miny, maxy, step}];
Table4 = Table[{x, miny}, {x, minx, maxx, step}];

TableFinal = Join[Table1, Table2, Table3, Table4];

Show[Table[ParametricPlot[
  Evaluate[{x[t], y[t]} /. sol[TableFinal[[i, 1]], TableFinal[[i, 2]]]],
  {t, 0, 10}, PlotRange -> {{minx, maxx}, {miny, maxy}},
  PlotLabel -> Style["Trajectories around x = 0", FontSize -> 15]] /.
  Line[x_] -> {Arrowheads[{0., 0.01, 0.}], Arrow[x]}, {i, Length[TableFinal]}]]
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In[4928]:= x0 = Pi;
minx = x0 - xrangelength/2;
maxx = x0 + xrangelength/2;

sol[u_, v_] := NDSolve[
  {x'[t] == y[t], y'[t] == -Sin[x[t]] - sigma * y[t], x[0] == u, y[0] == v}, {x, y}, {t, 10}]

Table1 = Table[{minx, y}, {y, miny, maxy, step}];
Table2 = Table[{x, maxy}, {x, minx, maxx, step}];
Table3 = Table[{maxx, y}, {y, miny, maxy, step}];
Table4 = Table[{x, miny}, {x, minx, maxx, step}];

TableFinal = Join[Table1, Table2, Table3, Table4];

Show[Table[ParametricPlot[
  Evaluate[{x[t], y[t]} /. sol[TableFinal[[i, 1]], TableFinal[[i, 2]]]],
  {t, 0, 10}, PlotRange -> {{minx, maxx}, {miny, maxy}},
  PlotLabel -> Style["Trajectories around x = pi", FontSize -> 15]] /.
  Line[x_] -> {Arrowheads[{0., 0.01, 0., 0., 0.}], Arrow[x]},
  {i, Length[TableFinal]}]]

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