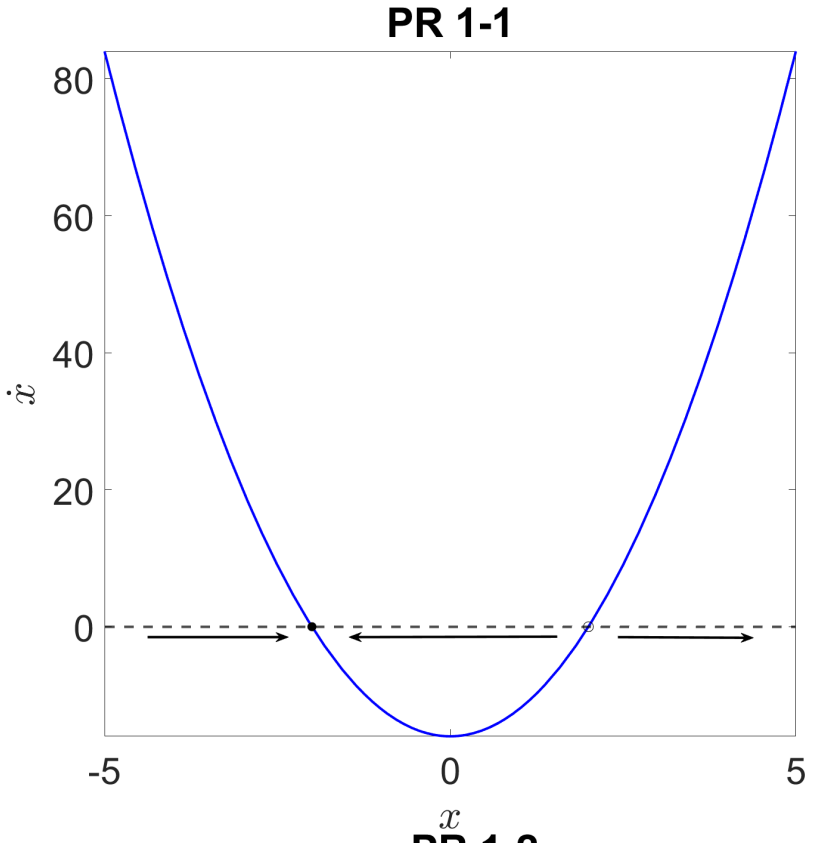
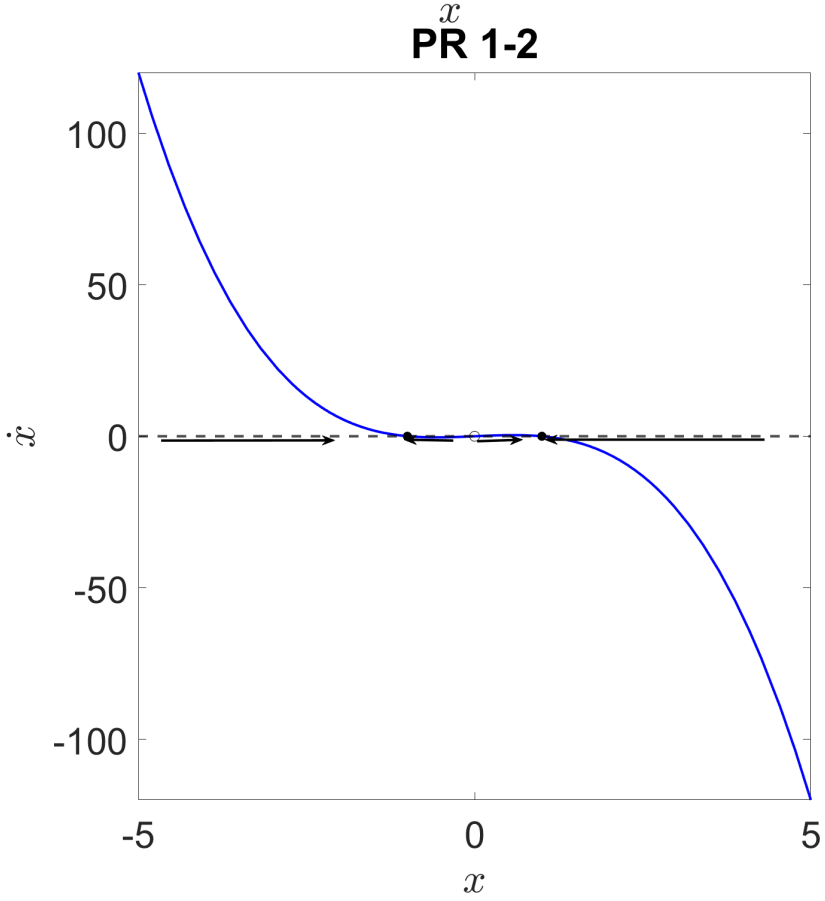
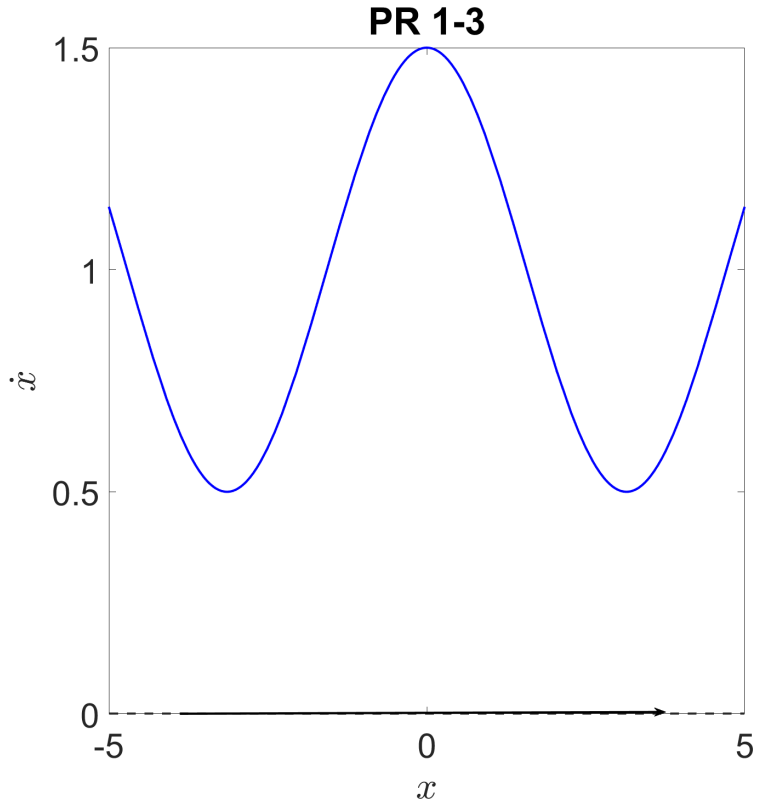
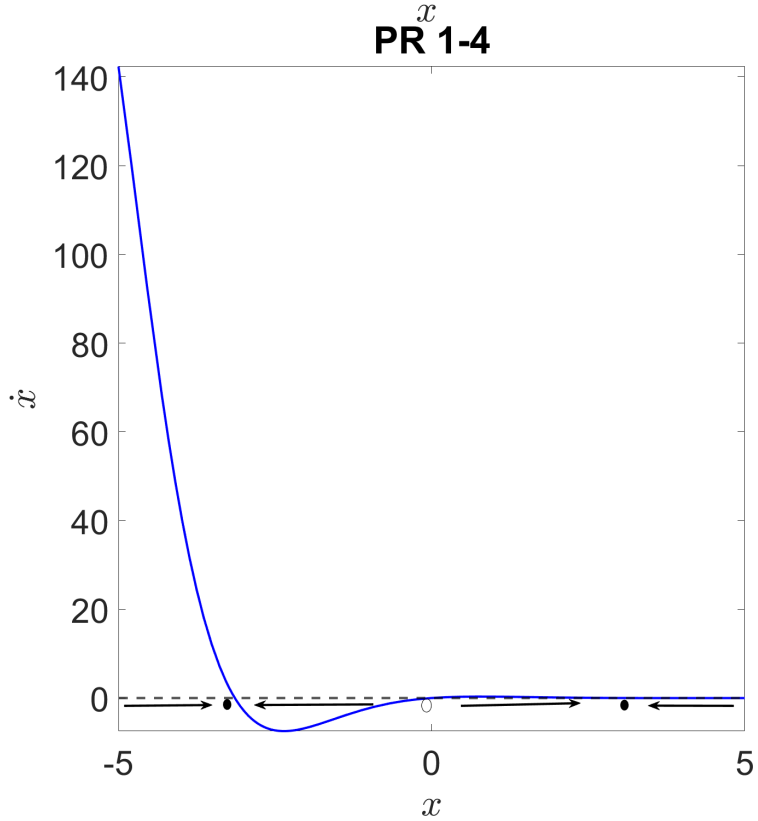

PR 1-1
80
60
40
20
0
-5
0
5
$\dot{x}$
x


PR 1-2
100
50
0
-50
-100
-5
0
5
$\dot{x}$
x


PR 1-3
1.5
1
0.5
0
-5
0
5
$\dot{x}$
x


PR 1-4
140
120
100
80
60
40
20
0
-5
0
5
$\dot{x}$
x

Problem 2

2.1

$$f(x) = 0$$

2.2

$$f(x) = \sin(\pi x)$$

2.3

Not possible in 1D. Equilibrium points must alternate between stable and unstable.

2.4

$$f_1(x, y) = x^2 + y^2 + 1$$

$$f_2(x, y) = x + y + 1$$

2.5

Not possible if continuously differentiable

Problem 3