Load the system. Van der Pol equation.

```
sys = ctrldemo('vanderpol2');
```

```
sys.f
```

```
ans =

                  -x2
 x1 + x2*(x1^2 - 1)
```

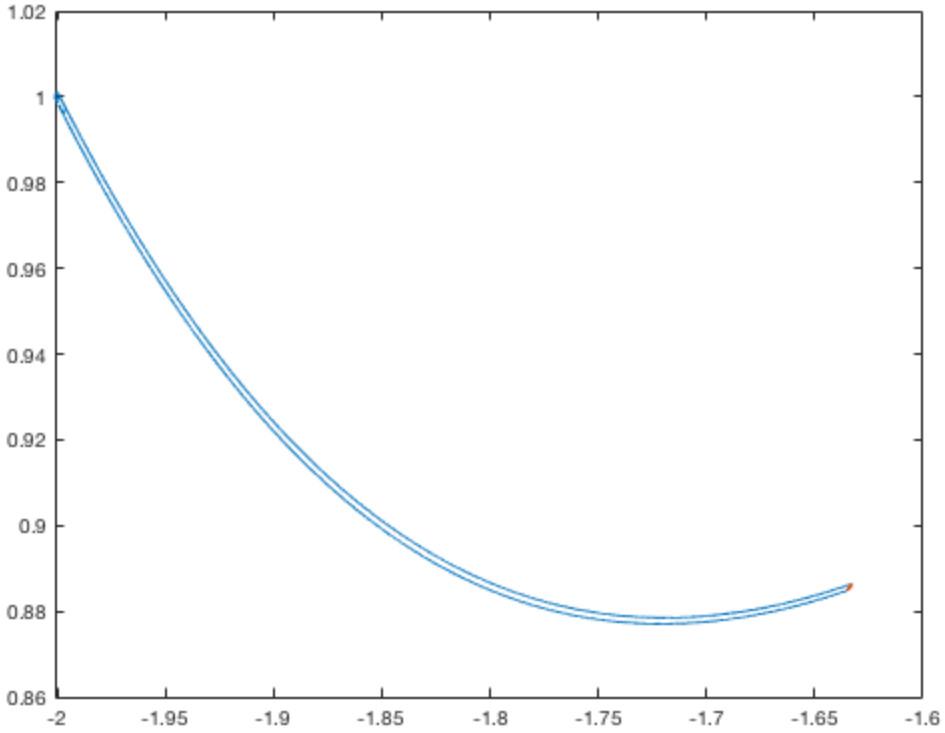
Find the backward reachable set.

```
x = {[-2, 1]};
```

```
[R, S] = reach(sys, x, 'Points', 10, 'Tf', 10, 'Ts', 1E-3);
```

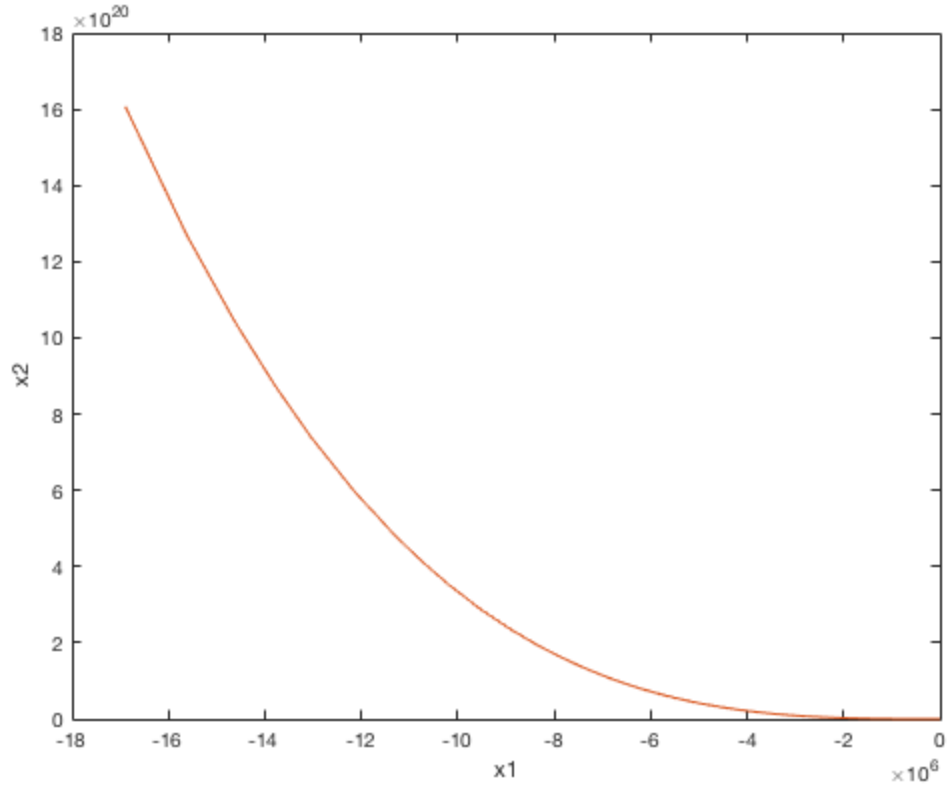
Plot the boundary of the regions.

```
b = boundary(R(:, 1), R(:, 2), 1);
plot(R(b, 1), R(b, 2));

hold on
b = convhull(S(:, 1), S(:, 2));
plot(S(b, 1), S(b, 2));
hold off
```



Simulate the system from initial conditions falling within the boundary.

```
polyin = polyshape(S(:, 1), S(:, 2));
[X, Y] = centroid(polyin);

nlsim2(sys, 0, [0 10], {[X, Y]});
```



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