Finding Lyapunov Functions
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0.0/15.0 points (graded)
Consider the system given by

$$\dot{x}_1 = x_2 - x_1^3$$
$$\dot{x}_2 = -x_2^3 - x_1.$$

Find a Lyapunov function $V\left(x_1, x_2\right)$ for this system in order to prove global asymptotic stability to the origin. Type in your answer in the MATLAB window below.

```
1 syms x1 x2 real;
2 V = ; % Type in your answer here in terms of x1 and x2
3
```

Unanswered

```
% For this question, the easiest way to obtain a Lyapunov function is to guess.
% The simplest possible Lyapunov function one could guess is V(x) = x1^2 + x2^2.
% Since this function is positive definite, we only need to check that its derivative
% is negative definite. The time derivative is -2*x1^4 - 2*x2^4, which is clearly negative defir

syms x1 x2 real;
V = x1^2 + x2^2;
```

◀   ▶

Run Code

Submit   You have used 0 of 3 attempts

ℹ   Answers are displayed within the problem