Limit Cycles

Limit Cycles

0.0/20.0 points (graded)

This question will test your understanding of limit cycles and Poincare analysis with a series of short questions.

(a) Which of the following statements about Poincare analysis are true? Select all that apply.

- [ ] A Poincare section is always two dimensional.
- [ ] The Poincare section must be perpendicular to the periodic orbit under consideration.
- [ ] A periodic orbit is (locally orbitally) stable if the Poincare return map is (locally) asymptotically stable.
- [ ] The Poincare return map is (locally) asymptotically stable if the periodic orbit is (locally orbitally) stable.
- [ ] The linearization of the Poincare return map always has one eigenvalue equal to 0.

(b) Which of the following is a limit cycle? Select all that apply.

- [ ] The unstable fixed point corresponding to the pendulum in the upright configuration.

- [ ] The periodic orbit of the Van der Pol oscillator.
- [ ] A periodic orbit of the undamped pendulum, e.g., the periodic orbit with constant energy $E > 0$.
- [ ] The homoclinic orbit of the undamped pendulum.
- [ ] The periodic orbit corresponding to the rimless wheel rolling down a gentle ramp.

(c) Suppose we have a system given by:

$$\dot{x} = f(x),$$

with $x \in \mathbb{R}$, i.e., a one dimensional system. Is it possible for this system to have a limit cycle?

- ( ) Yes
- ( ) No

Submit You have used 0 of 1 attempt