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AMATH 502

HOMEWORK 3

Exercises come from a pdf provided by instructor.

- 1:** For each of the following vector fields, find and classify all the fixed points, and sketch the phase portrait on the circle.

(a) $\dot{\theta} = 1 + 2 \cos \theta$

Solution:

TODO

(b) $\dot{\theta} = \sin \theta + \cos \theta$

Solution:

TODO

(c) $\dot{\theta} = \sin 4\theta$

Solution:

TODO

2: From pdf

(a) Graph ...

Solution:

TODO

(b) Write ...

Solution:

TODO

(c) Find ...

Solution:

TODO

(d) Using ...

Solution:

TODO

(e) What kind ...

Solution:

TODO

(f) Assuming ...

Solution:

TODO

3: Plot the phase portrait and classify the fixed point of the following linear systems. put the system in matrix form.

(a) $\dot{x} = y, \quad \dot{y} = -2x - 3y$

Solution:

TODO

(b) $\dot{x} = 3x - 4y, \quad \dot{y} = x - y$

Solution:

TODO

(c) $\ddot{x} + 2\dot{x} - x = 0$

Solution:

TODO

4: Lots of text here (from pdf)

(a) Rewrite ...

Solution:

TODO

(b) Show ...

Solution:

TODO

(c) Classify ...

Solution:

TODO

5: From pdf

(a) (Not graded)

Solution:

TODO

(b) Do the following for $a > 1$ and $a < 1$

(i) Determine

Solution:

TODO

(ii) Verify

Solution:

TODO

(c) Summarize

Solution:

TODO