Math 558   Applied Dynamical Systems   Winter 2023

hw2 , due: Thursday, February 16, 4pm

Chapter 1, page 38

1. Q1.16 conservative system with periodic solutions

2. Q1.17 oscillation of a nonlinear spring

3. Q1.27 a continued fraction

In iterating the mapping, given $x_0 = r$ it is sufficient to write down x_1, x_2, x_3 in continued fraction form. In using the iteration to compute $\sqrt{101}$ to six significant digits, take $r = 10$.

4. Q1.32 the asymptotic solution of the logistic map with $a = 1$

The problem asks you to show that if $0 < x_0 < 1$, then $x_n \sim 1/n$ as $n \to \infty$. First show this heuristically and then find a rigorous proof.

5. Q1.33 the explicit solution of the logistic map with $a = 2$

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6. Q2.3 an eigenvalue problem for a nonlinear integro-differential equation