PHY 4210-01 Senior Lab
Lab C1: Mathematical Models of Chaotic Physical Systems

Sarah Arends
Jacquelyne Miksanek
Ryan Wojtyla

Instructor: Gus Azelis

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Abstract

Chaotic behavior was studied by creating mathematical models and altering key parameters. A simple chaotic model was then observed by measuring time intervals of droplet formation from a leaking faucet. A small change in initial conditions can equate to much larger changes in the behavior of a system.

Contents

1 Data Analysis

1.1 Water Drop Experiment

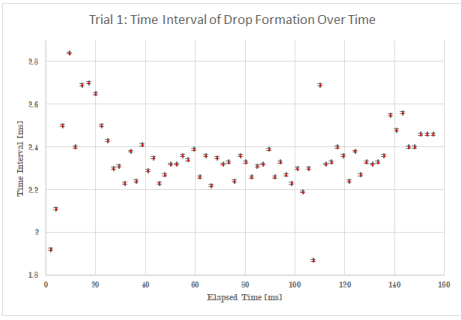

Figure 1: sink1

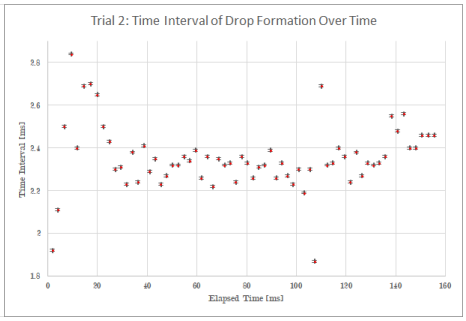

Figure 2: sink2

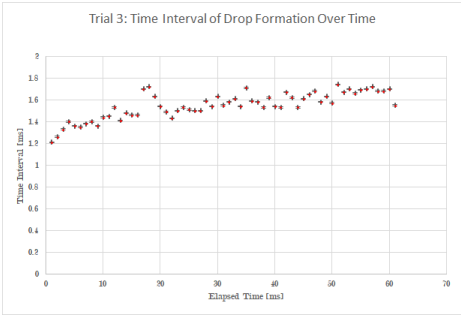

Figure 3: sink3

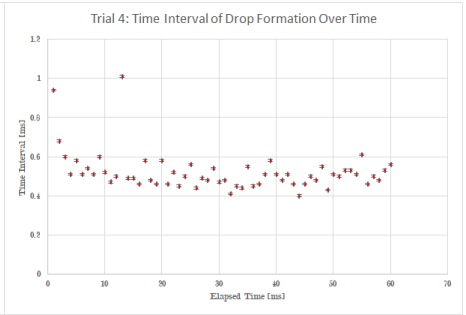

Figure 4: sink4

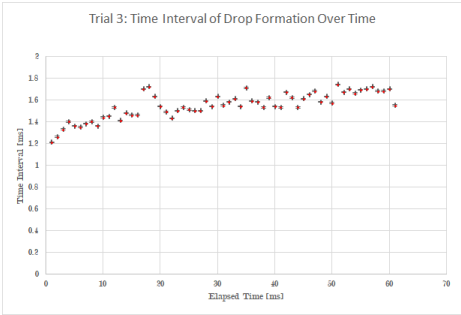

Figure 5: sink3

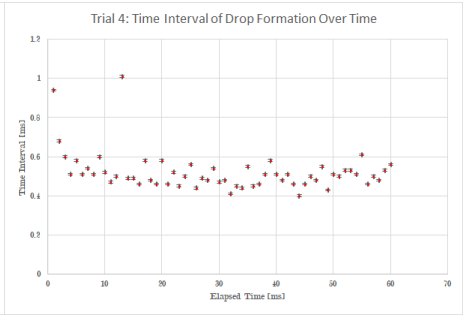

Figure 6: sink4

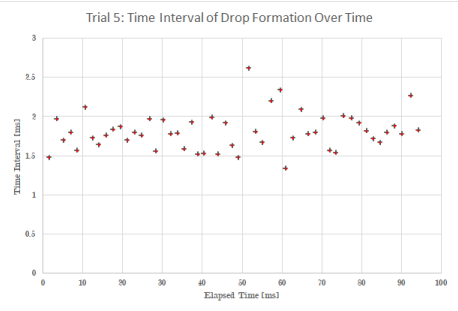

Figure 7: sink5

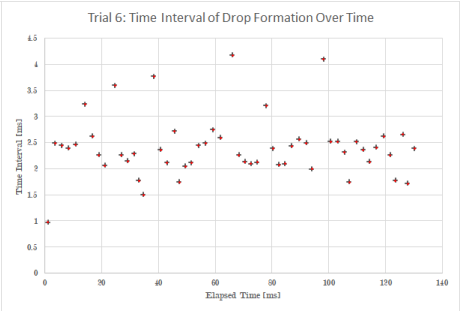

Figure 8: sink6

2 Results: Discrepancies and Uncertainties

3 Sources of Error

4 Conclusion

5 Appendices

5.1 Appendix A: Data

5.2 Appendix B: Source Code

5.2.1 Error Propagation and Data Processing