

Problem in Project3 : Driven Damped Pendulum motion

Grading system:

- a) 75% for Content & Results (numerical solutions, etc.);
- b) 15% for Presentations (Graph labelling, Number of data points, etc.);
- c) 10% for Code efficiency (Choice of methods, algorithm, etc.)

Results(18pt):

Part1 - Unforced ($A=0$) (5pt)

- (2 pt) Theta vs time ($\nu=1,5,10$)
 - (2 pt) Theta vs velocity ($\nu=1,5,10$)
 - (1pt) Classify the three kinds
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Part2 - Unstable manifold of chaotic motion (7pt)

- (2 pt) Theta vs time ($A=0.5,1.2$)
 - (2 pt) Theta vs velocity ($A=0.5,1.2$)
 - (1 pt) Classify the two kinds
 - (2 pt) justify the choice of stepsize/tolerance
- $A=1.2$ is in the unstable manifold of the chaotic behaviour, and the error is timestep-sensitive. It grows exponentially over time. One should realize this or show that the error always meet the requirement of precision needed.
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Part3 - Poincare section (6pt)

- (2pt) theta vs time ($A=1.35,1.44,1.465$)
- (2pt) theta vs velocity using only points of $wt=2\pi n$ ($A=1.35,1.44,1.465$)
- (2pt) Classify the three kinds (-1 if partly correct)

*For any plot in which theta is not constrained within 2π , deduct one presentation mark.