Midterm Examination

Midterm examination:

Will be given Friday 23 October at 1900-2300 hr in **B&L 208.**

Office hours:

Doug Cline; Friday 23 October, 1000-1200 hr in B&L203D

Content of midterm:

The midterm examination will comprise four full multipart questions. It is a closed-book, nominally a 3-hour, exam but extra time is scheduled. A calculator may be needed but emphasis will be on concepts and the equations of motion rather than numerical answers. There will be no trick questions, all straightforward bookwork. The questions will emphasize material as discussed below.

Chapter 1: Not explicitly part of the examination.

Chapter 2: Newtonian mechanics is **important**. It will feature throughout the examination implicitly and probably in one question.

Chapter 3: Linear damped oscillations **important** but Fourier analysis will not be emphasized.

Chapter 4: The general features of non-linear systems and chaos should be known, but only qualitative aspects may be addressed in a partial question. Quantitative exam questions on non-linear systems are not viable.

Chapter 5: Calculus of variations will not be addressed explicitly, but implicitly it will be used extensively for Lagrangian and Hamiltonian mechanics.

Chapter 6: Lagrangian dynamics is **very important**. Applications will cover questions featuring constraints that can be solved with generalized coordinates and Lagrange multipliers. Must know how to use generalized coordinates, derive equations of motion, and derive forces of constraint. Will require ability to solve the equations of motion. You will not be asked to reproduce the derivation of Lagrange equations from either d'Alembert or Hamilton's Principles.

Chapters 7, 8: Hamiltonian mechanics is **very important.** Need to know the symmetries/conservation laws, Noether's theorem, cyclic coordinates, properties of Hamiltonian, Hamilton's equations of motion. You should be able to use Hamiltonian mechanics to solve simple mechanical systems. Questions on Routhian reduction are postponed to the final examination.

Chapters 9: Conservative two-body central-force orbits will not be an explicit part of the exam. However, knowledge of this material will facilitate solving exam questions.