**MAE 511 HW Set 1**

**Due Sept 5, 2018 by 3pm**

1. Use Mathematica™ to show that Equations 3.5-1 and Equations 3.5-2 from the Thomson book are equivalent. Hint: To accomplish this, use the matrix form of these equations as found in Equations 3.5-3 and 3.5-4.

2. Use matlab™ to simulate (using ode45) the equations of motion for a double pendulum found on page 78 of the Meirovitch book. Set m1 = 2 kg, m2 = 3 kg, L1 = 0.8 meters, L2 = 0.6 meters, and use initial conditions: θ1(0) = 0.2 radians, θ2(0) = 0.3 radians, dθ1/dt(0) = 0.4 radians/second, dθ2/dt(0) = 0.5 radians/second. Simulate the equations for 20 seconds and plot θ1(t) and θ2(t) versus time on separate plots.

Format: For the write-up of this assignment, please include your name, due date, the problem statements, a description of your solution procedure, your computer code, and clearly labeled plots (for problem 2). The assignment should be prepared as a coherent, legible, document, i.e. not just a collection of computer code along with some plots.