

**Math 442 Homework Assignment 5**  
**Due Thursday, April 16, 2009**

1. Formulate the Differential Algebraic Equation (DAE) system corresponding to the motion of a frictionless marble on a parabolic surface.
2. You are to modify the MATLAB codes in `hw5_codes.zip` to solve the DAE system from Problem 1. Hand in (i) a code listing; and (ii) graphical evidence that your codes work as intended.
3. (Extra Credit) You are to develop a higher order accurate implementation of your DAE solver and apply it to the DAE system from Problem 1. Hand in (i) a pseudo-code description of your implementation; (ii) a code listing; and (iii) graphical evidence that your codes work; (iv) evidence that your implementation really is more accurate.