

ESc101 Laboratory Assignment

Thursday of Week of 6/9/04

September 7, 2004

1 Polynomial

1.1 Problem

(i) Define class Term (term stands for $c.t^k$). It has two member data: c (double) and k (int). Its methods include (a) $\text{val}(t)$ which gives the value of the term at the given t . (b) $\text{valInt}(t_1, t_2)$ which gives the value of $\int_{t_1}^{t_2} c.t^k .dt$. Write a constructor.

(ii) Define class Poly2d (second degree polynomial). It will have three term objects one for second-degree term, one for first-degree term and one for the constant term. Its methods will include (a) $\text{val}(t)$ which gives the value of the polynomial at t . (b) $\text{valInt}(t_1, t_2)$ which gives the value of the integral of the polynomial in the interval from t_1 to t_2 . (c) $\text{root}()$ which returns the bigger root of the polynomial. Write two constructors: (1) which takes three Term objects respectively of degree 2, degree 1, and degree 0. (2) which takes $(c_2, k_2, c_1, k_1, c_0, k_0)$ as input.

(iii) Define class MaxDist. It has only "main" method. It takes a polynomial, $f(t)$, of second degree; and some number x_0 . A vehicle moves with velocity $f(t)$ and it is at x_0 at time 0, then it computes and prints the maximum distance reached by the vehicle. Note we will assume that $f(x)$ approaches minus-infinity as t approaches infinity (or minus-infinity). After reading in the input, construct Poly2d object for $f(t)$. Then using its method find the larger time t_z when velocity reaches zero. At that time, using a method, find the position of the vehicle.

Note: Use only the features that we have covered before the exam. that means no if-else, no loops, no arrays etc.