

ESc101 Laboratory Assignment

Monday of Week of 6/9/04

September 1, 2004

1 MaxPoly Function

1.1 Definition

Let us define a type of functions, *maxpoly* as follows. $F_{pq}(x)$ is a maxpoly function where $p(x)$ and $q(x)$ are second-degree polynomials. Then $F_{pq}(x) = \max p(x), q(x)$, for all x .

1.2 Problem

(i) Design class Poly which has three coefficients, C_0, C_1, C_2 , of a second degree polynomial as its data. It has a method *Eval* which evaluates the value of the polynomial at a given x . It also has a method *Plot* which plots the polynomial in the range $x = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10$ in the user-given colour (use object `Color.xxx`).

(ii) Design class MaxPoly which has two Poly objects, p, q , as data. It has two methods: *Plot* and *Integrate*. Method *Plot* plots the value of F_{pq} at $x = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10$ in the user-given colour. Method *Integrate* approximates the area under the curve F_{pq} in the range 0 to 10 by trapezoidal method. Write two constructors for this class. One takes six coefficients as input and the other takes two Poly objects as input.

(iii) Write a class Test with only the main method. This class generates two Poly objects by reading the coefficients from the user. It plots the two polynomials in red and blue. Then it creates a MaxPoly object from these Poly objects. Then plots the maxpoly on the same window in green. Also computes the area under the maxpoly curve. Next, create second maxpoly object using the six coefficients, same as before. Once again plot the maxpoly curve, again in the same window. Again compute the area under the curve.