

Math 261 Fall 2011

Lagrange Interpolation Polynomials Pseudocode

INPUT: vector x ; vector $y = f(x)$; a point to evaluate z

OUTPUT: Pz Lagrange polynomial $P(x)$ evaluated at z

Step 1 Initialize variables. Set Pz equal zero. Set n to the number of pairs of points (x, y) . Set L to be the all ones vector of length n .

Step 2 For $i = 1$ to n do ...

Step 3 For $j = 1$ to n do Step 4.

Step 4 If $i \neq j$ then $L_i = (z - x_j)/(x_i - x_j) * L_i$

Step 5 $Pz = L_i * y_i + Pz$

Step 6 Output Pz . Stop.

Note that for error checking, a Step 0 can be added to check

- (i) that x and y are the same length,
- (ii) that x and y each have at least two components, and
- (iii) that no two entries in x are the same.

For instance, if the lengths are different, then generate an error message such as “The method failed since x and y are not the same length.”