CS 323E  

Homework 2  

Due: Oct. 2, 2001

In this project, we examine how to plot continuous curves that do not necessarily correspond to functions.

1. Write a short word (e.g. your name) using a continuous curve on a piece of graph paper.

2. Pick a limited number of point on the curve, say 20, and create tuples \((x_i, y_i)\), \(i = 1, \ldots, n\) that represent these points.

3. Write a program that

   (a) Takes the number of tuples, and the tuples themselves, as input.

   (b) Converts the tuples into two sets of tuples, \((t_i, x_i)\) and \((t_i, y_i)\), \(i = 1, \ldots, n\). Here \(t_i\) represents distance traversed along the curve. You may want to experiment with

       * \(t_i = i\), or

       * \(t_1 = 0, t_i = \sqrt{(y_i - y_{i-1})^2 + (x_i - x_{i-1})^2}, i = 2, \ldots, n\).

   (c) Use the function InterpRecur in the text to create coefficients for the polynomials \(p(t)\) and \(q(t)\) which go through the points \((t_i, x_i)\) and \((t_i, y_i)\), respectively.

   (d) Plot the curve \((p(t), q(t))\) by creating a vector of equally spaced points \(t\) and feeding this vector to the function HornerN in the text, once for each polynomial. Take the result vectors, \(p\) and \(q\), and plot plot( p, q ).