Explanation Cubic splines

A cubic spline is a piecewise polynomial . Let

Where Moreover we assume that p is continuous with first and second continuous in . A basis for the space

Therefore can be expressed as a linear combination of elements in *B* in the following way.

Given points and with with , The cubic spline is determined by the solution in of the system of equations

This system of equation has unknowns and n equations, to fore a unique solution we must impose two more conditions .

Additionally, we have to remove all the shifted elements that do not satisfy the conditions in each of the equations. The final system is.

We can solve the system of equations by doing a RREF

After the RREF the values we get in the last two columns will be the values for , the value of the column represent the values of *a* for and the values of column the ones of .

Example Cubic splines

Cubic spline though

With a regular mesh

Now the polynomial for x would be the values for from the first columns and the one for y the values from the second column.