

Homework #1 _ 2000 Winter

MEAM 501 Analytical Methods in Mechanics and Mechanical Engineering

Using the data set

$$\begin{pmatrix} 0 & 0.0909091 \\ 0.2 & 0.135135 \\ 0.4 & 0.217391 \\ 0.6 & 0.384615 \\ 0.8 & 0.714286 \\ 1. & 1. \\ 1.2 & 0.714286 \\ 1.4 & 0.384615 \\ 1.6 & 0.217391 \\ 1.8 & 0.135135 \\ 2. & 0.0909091 \end{pmatrix}$$

1. Construct a 10th degree Lagrange polynomial that passing through the data points exactly.
2. Applying the Least Squares Method, curve fit the data by 4th, 5th, 12th degree polynomials.
3. Approximate the curve by the Bazier splines.
4. Compute the length of the curves obtained in above (that is, in 1, 2, and 3).
5. Determine the tangent and normal vectors of the curves obtained in above.

Repeat the above questions to the data set

$$\begin{pmatrix} 0 & 0.0541211 \\ 0.2 & 0.0849866 \\ 0.4 & 0.160948 \\ 0.6 & 0.334528 \\ 0.8 & 0.684596 \\ 1. & 1. \\ 1.2 & 0.743976 \\ 1.4 & 0.434703 \\ 1.6 & 0.273835 \\ 1.8 & 0.185284 \\ 2. & 0.127697 \end{pmatrix}$$