Numerical Analysis- ME 542

Assignment-2 report

Newton form of the polynomial

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Polynomial interpolation of arcten(x) function using newton form while x in [1,6]

f(x) = arcten(x)

Polynomial of second order interpolation of arcten(x)

f(x) = 0.785398+0.202839(x-1)- -0.0315158(x-1)(x-3.5)

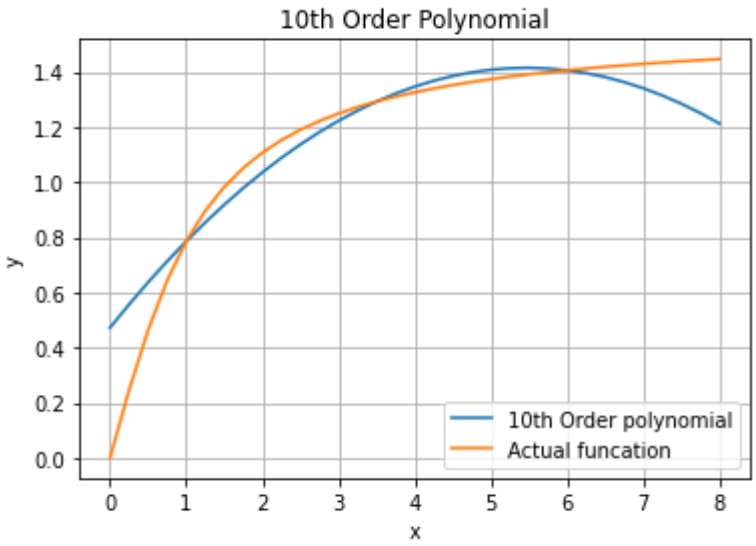

Figure.1 Second order interpolation function

Polynomial of fourth order interpolation of arcten(x)

f(x) = 0.785398+ 0.293739(x-1) - 0.0727197(x-1)(x-2.25) + 0.0134936(x-1)

(x-2.25)(x-3.5) - 0.00200469 (x-1)(x-2.25)(x-3.5)(x-4.75)

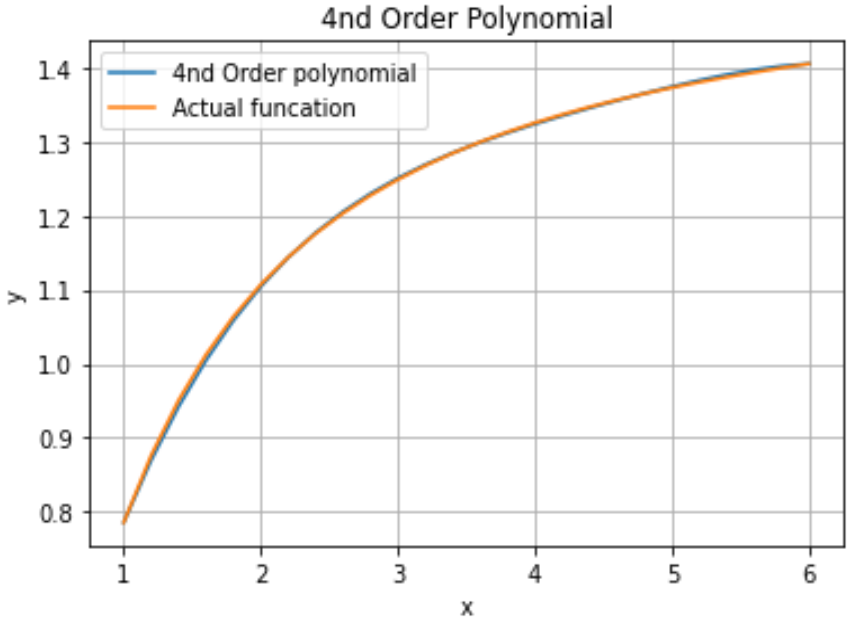

Figure.2 fourth order interpolation function

Polynomial of fourth order interpolation of arcten(x)

f(x) = 0.785398 +0.785398(x-1) +0.394791(x-1)(x-1.5)-0.146081 (x-1)(x-1.5) (x-2) + 0.0424358 (x-1)(x-1.5)(x-2)(x-2.5)

- 0.00999904 (x-1)(x-1.5)(x-2)(x- 2.5)(x-3)

+ 0.00193357 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)

- 0.000303025 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)(x-4)

+3.59793e-05 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)(x-4)-2.29412e-06 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)(x-4)(x-4.5)

-2.76347e-07 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)(x-4)(x-4.5)(x-5)

+1.35163e-07 (x-1)(x-1.5)(x-2)(x-2.5)(x-3)(x-3.5)(x-4)(x-4.5)(x-5)(x-5.5)

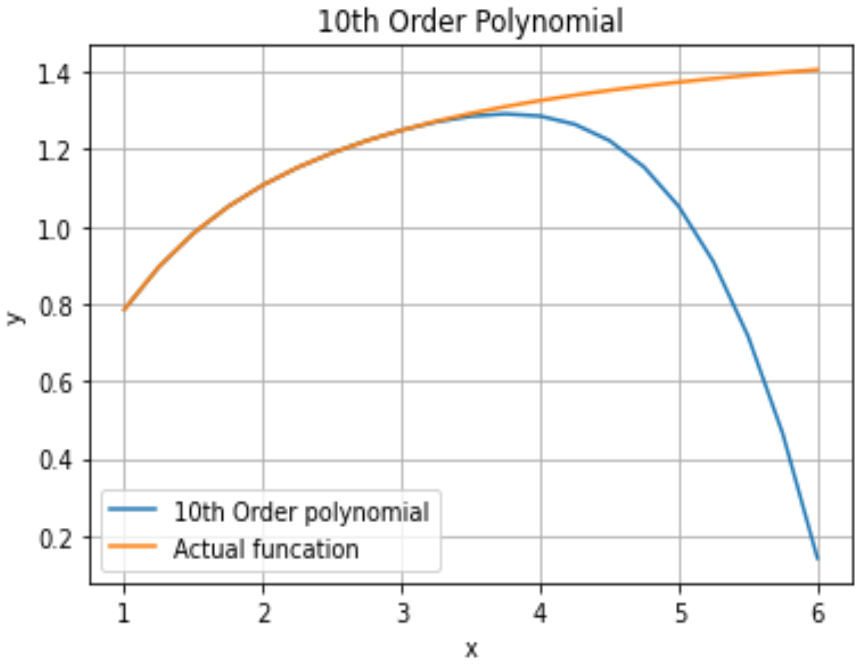

Figure.3 fourth order interpolation function