

NA programming homework #2

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2024 年 10 月 22 日

Problem A

Problem B

Compile and run the program B.cpp. its output is the Newton interpolation polynomial of each situations. It is shown as below.

when $n=2$, $p(x)=0.03846+0.1923*(x+5)-0.03846*(x+5)*x$

when $n=4$, $p(x)=0.03846+0.03979*(x+5)+0.06101*(x+5)*(x+2.5)-0.02653*(x+5)*(x+2.5)*x+0.005305*(x+5)*(x+2.5)*x*(x-2.5)$

when $n=6$, $p(x)=0.03846+0.02646*(x+5)+0.02485*(x+5)*(x+3.333)+0.01494*(x+5)*(x+3.333)*(x+1.667)-0.01317*(x+5)*(x+3.333)*(x+1.667)*x+0.004203*(x+5)*(x+3.333)*(x+1.667)*x*(x-1.667)-0.0008406*(x+5)*(x+3.333)*(x+1.667)*x*(x-1.667)*(x-3.333)$

when $n=8$, $p(x)=0.03846+0.02234*(x+5)+0.01396*(x+5)*(x+3.75)+0.01117*(x+5)*(x+3.75)*(x+2.5)+0.0006743*(x+5)*(x+3.75)*(x+2.5)*(x+1.25)-0.004896*(x+5)*(x+3.75)*(x+2.5)*(x+1.25)*x+0.00244*(x+5)*(x+3.75)*(x+2.5)*(x+1.25)*x*(x-1.25)-0.0006872*(x+5)*(x+3.75)*(x+2.5)*(x+1.25)*x*(x-1.25)*(x-2.5)+0.0001374*(x+5)*(x+3.75)*(x+2.5)*(x+1.25)*x*(x-1.25)*(x-2.5)*(x-3.75)$

Use matlab to plot each $p(x)$ and the function $\frac{1}{1+x^2}$ in $[-5, 5]$. The image is as follows.

Problem C

Problem D

Problem E

Problem F

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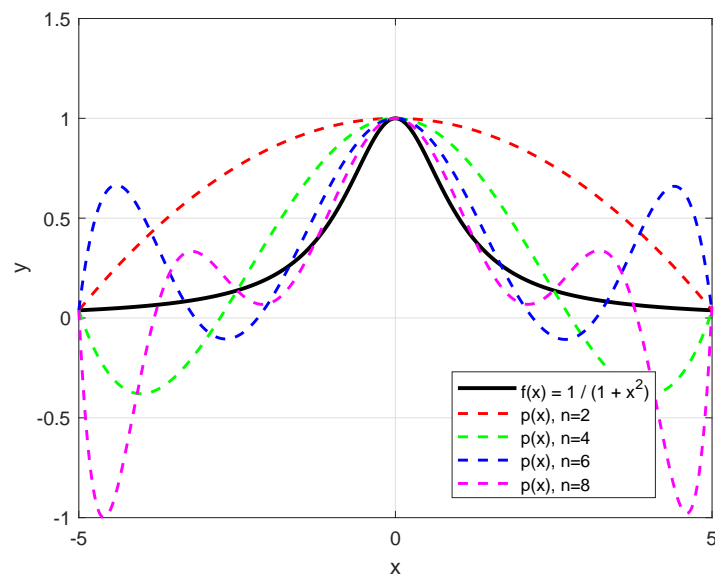


Fig. 1: Comparison of interpolating Polynomials and Function $f(x) = \frac{1}{1+x^2}$