Quantitative Macro – Homework 1

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Question 1.1: Taylor series

The objective is to use Taylor series approximations of orders 1,2,5 and 20 of the function $f(x) = x^0.321$ around a point x_bar on the domain (0,4).

figure to follow

Question 1.2: Taylor series Ramp function

figure to follow

Question 2: Interpolation nodes and approximation using polynomials

Evenly spaced interpolation nodes and a cubic polynomial

Chebyshev interpolation nodes and a cubic polynomial

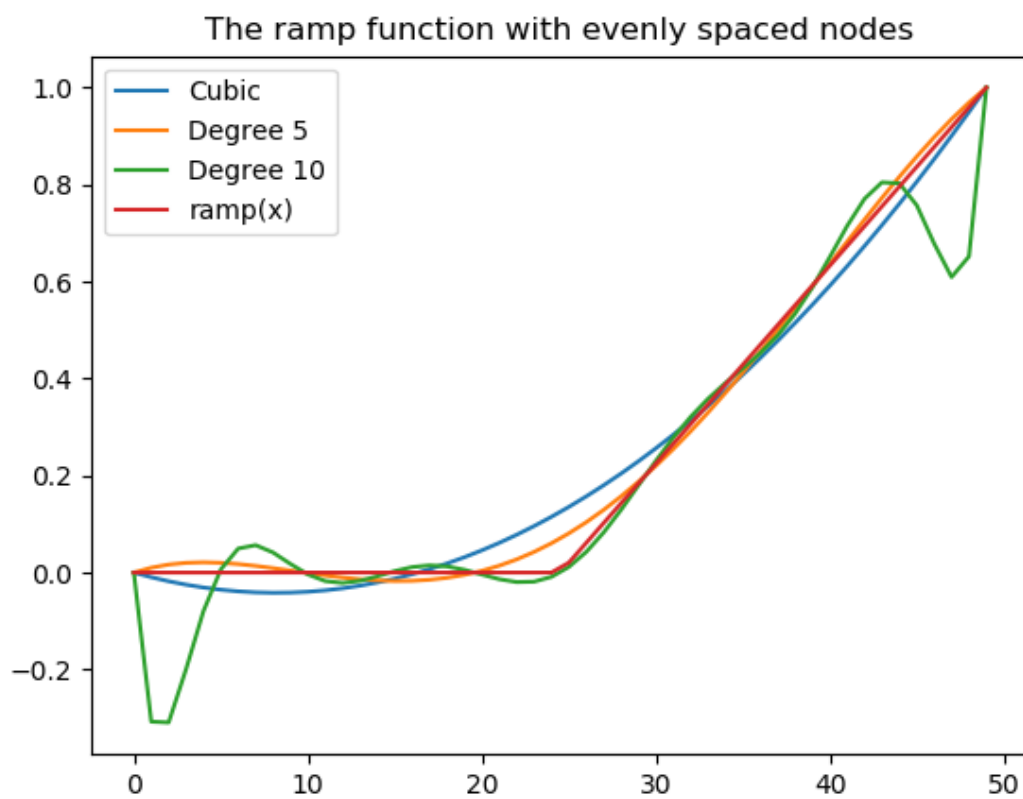**Chebyshev interpolation nodes and Chebyshev polynomials**

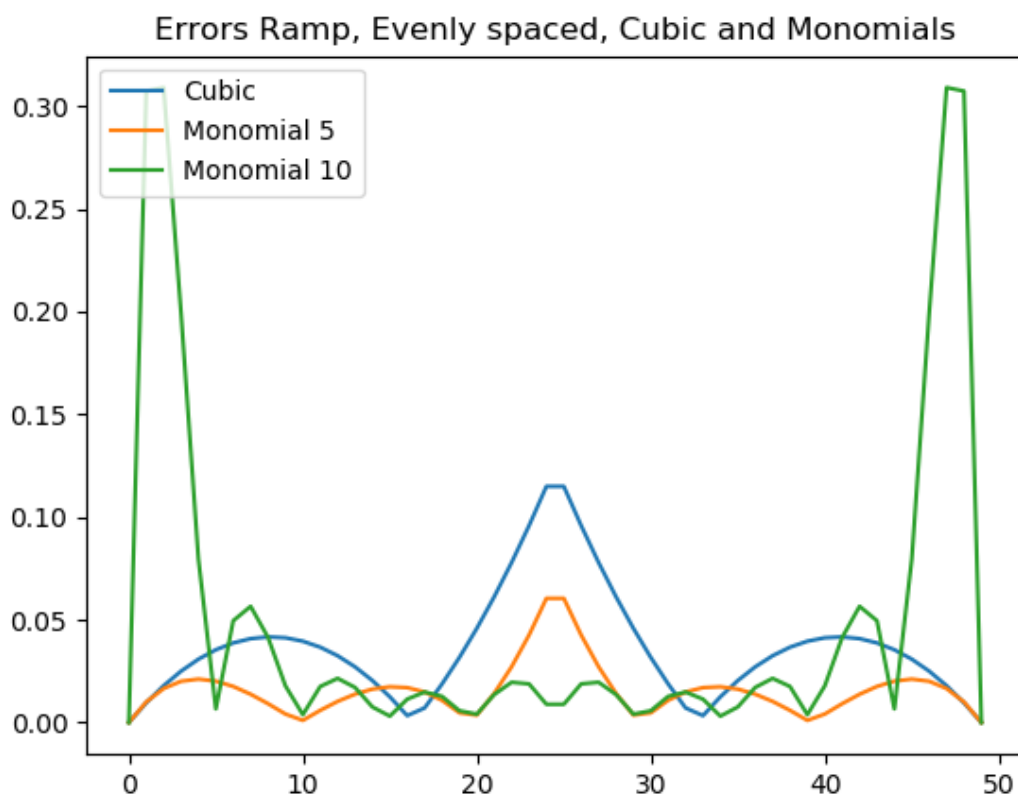Figure 1: Ramp: Approximation using evenly spaced nodes and monomials

Figure 2: Ramp: Errors of approximation using evenly spaced nodes and monomials
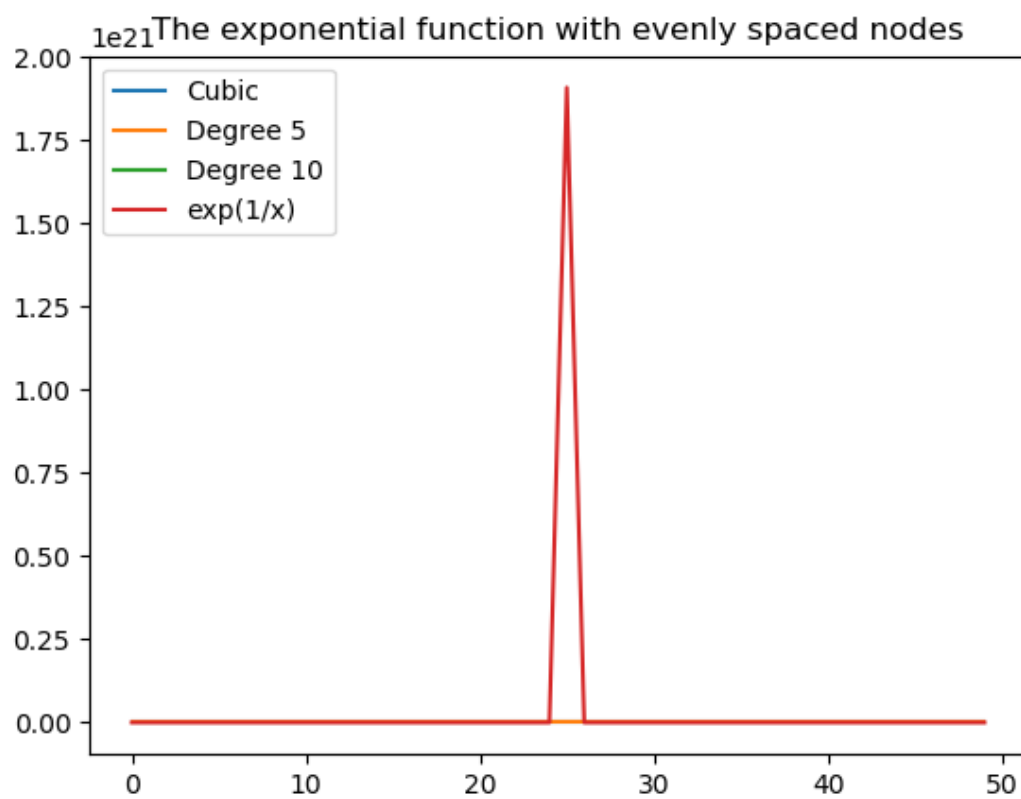
3

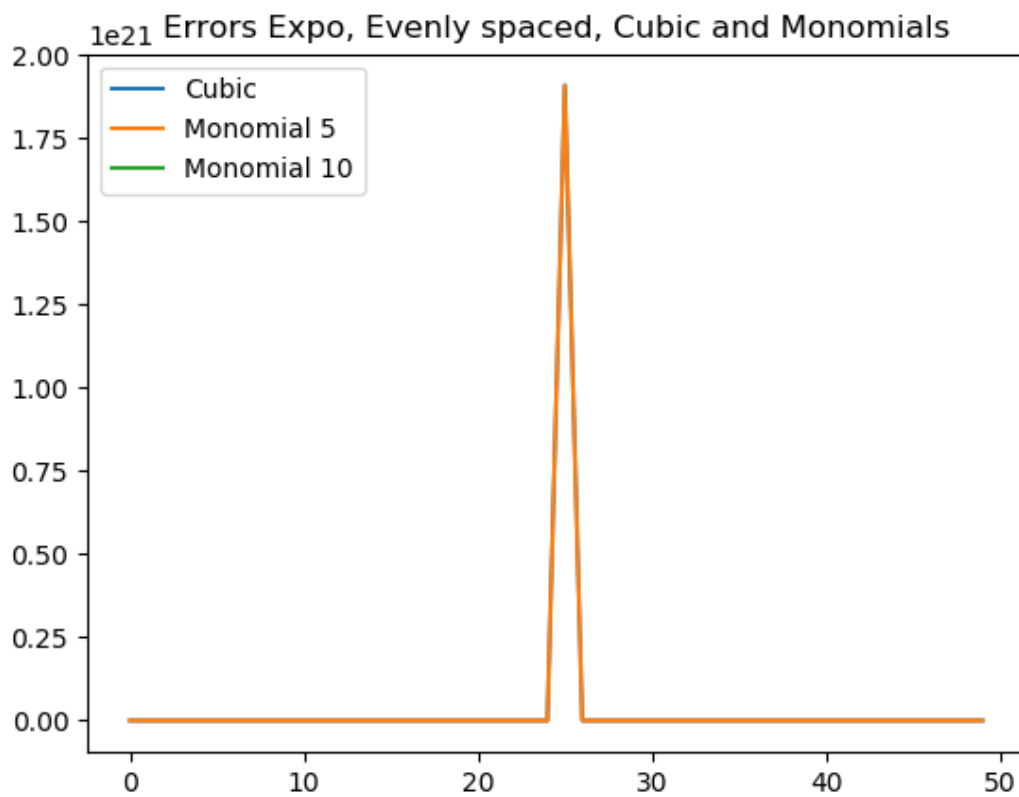Figure 3: Exp: Approximation using evenly spaced nodes and monomials

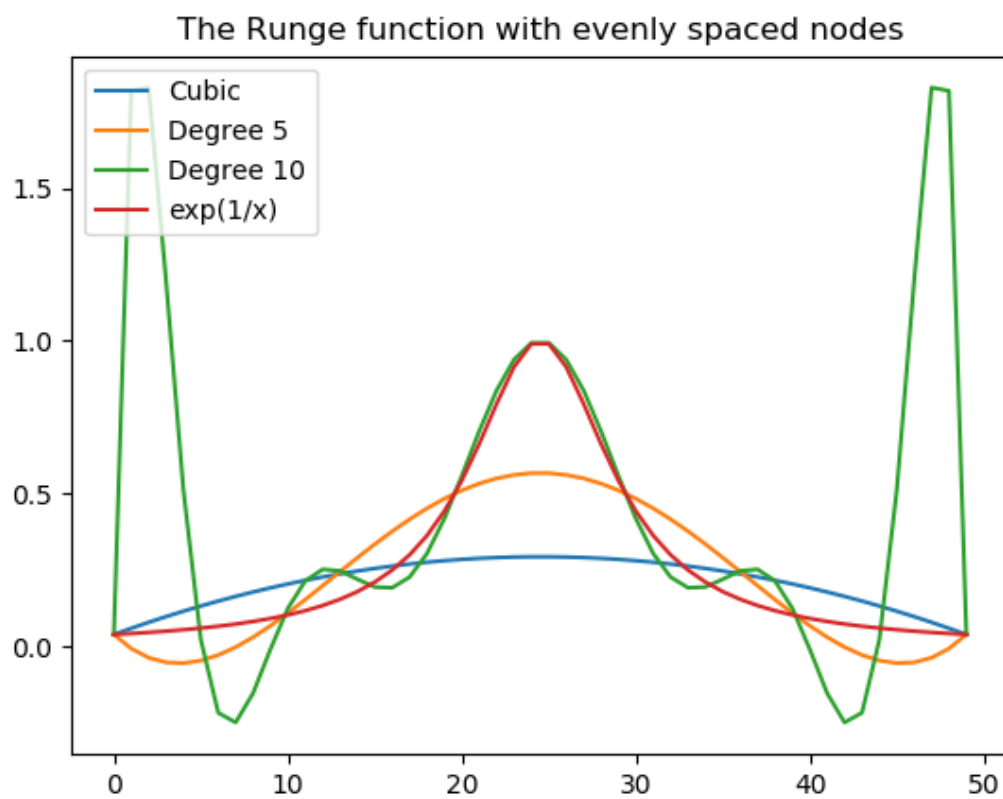Figure 4: Exp: Errors of approximation using evenly spaced nodes and monomials

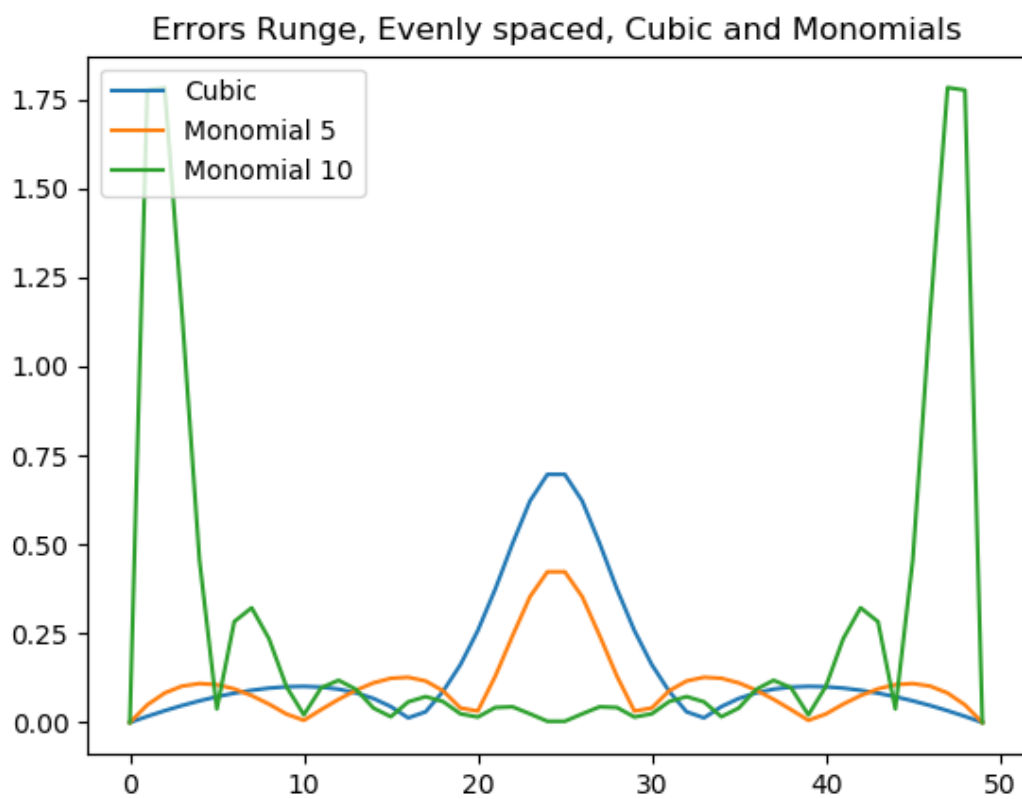Figure 5: Runge: Approximation using evenly spaced nodes and monomials

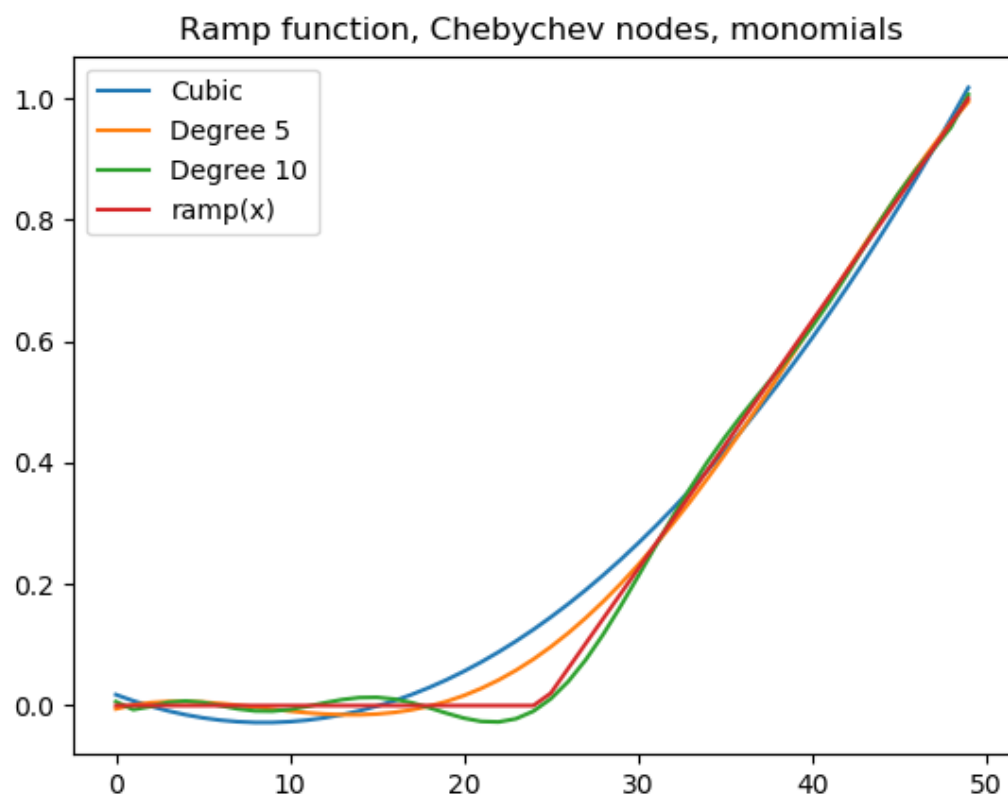Figure 6: Runge: Errors of approximation using evenly spaced nodes and monomials

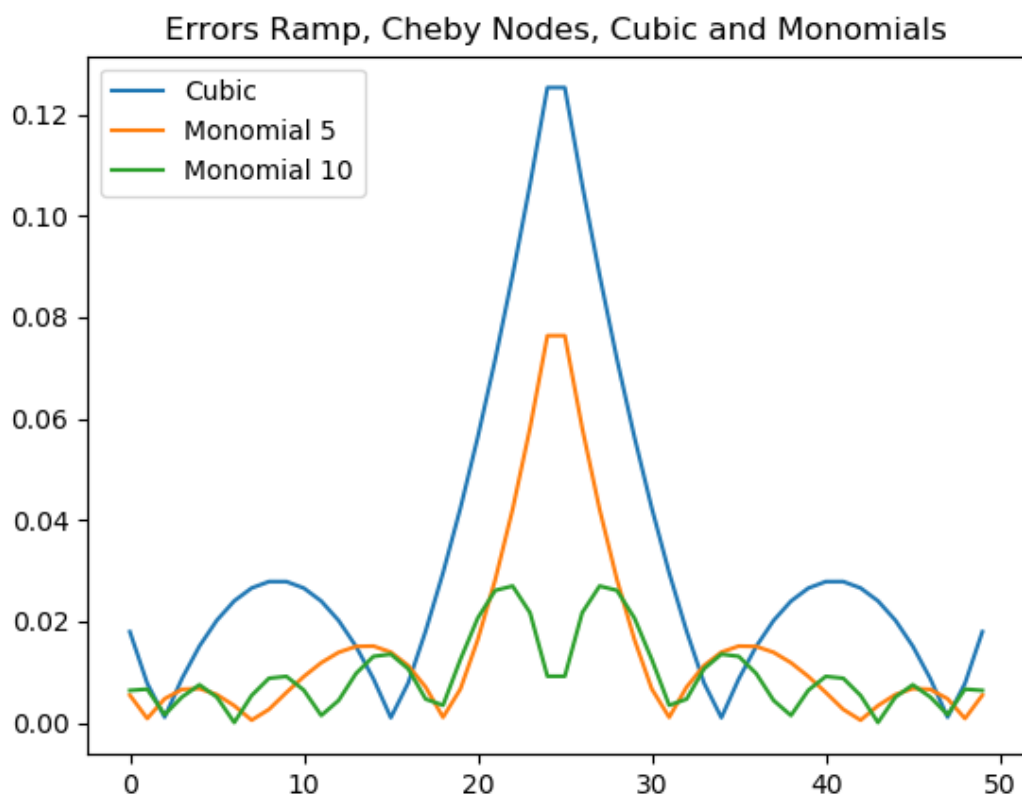Figure 7: Ramp: Approximation using Cheby nodes and monomials

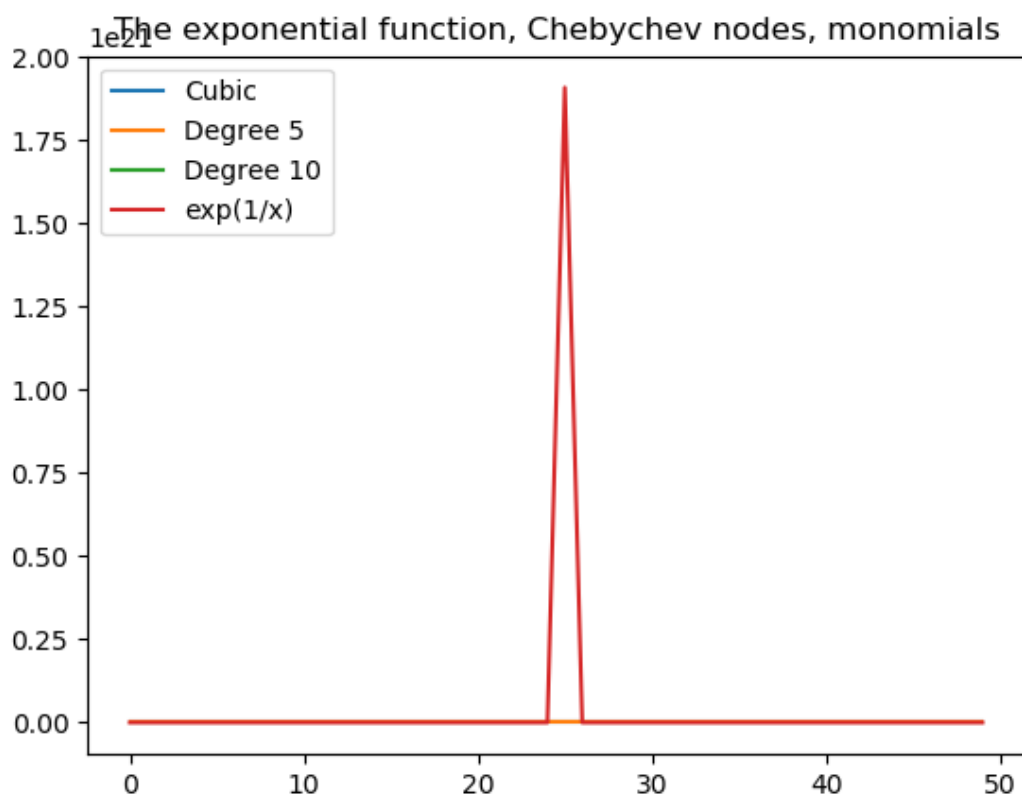Figure 8: Ramp: Errors of approximation using Cheby nodes and monomials

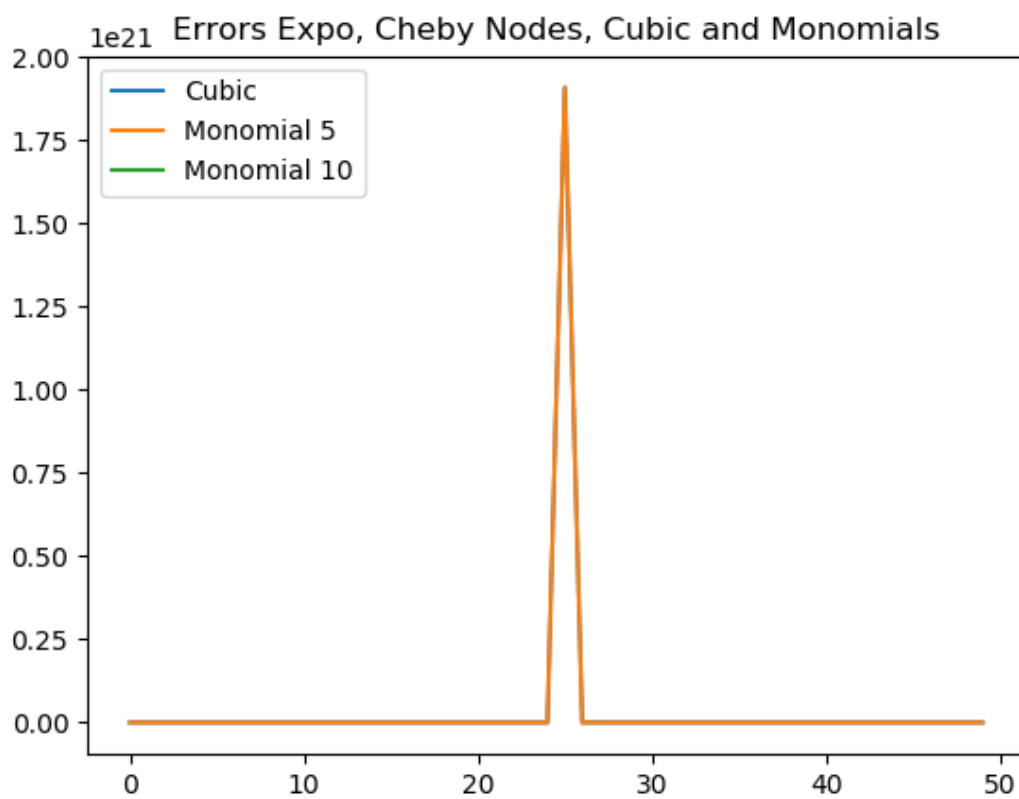Figure 9: Exp: Approximation using Cheby nodes and monomials

Figure 10: Exp: Errors of approximation using Cheby nodes and monomials
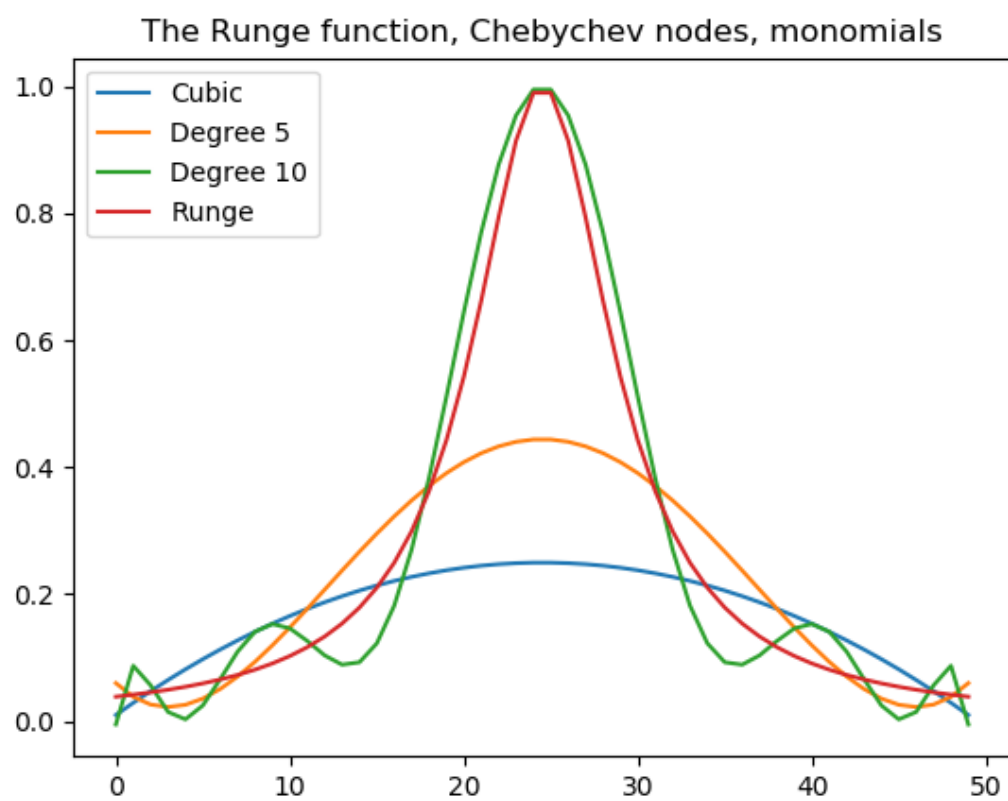
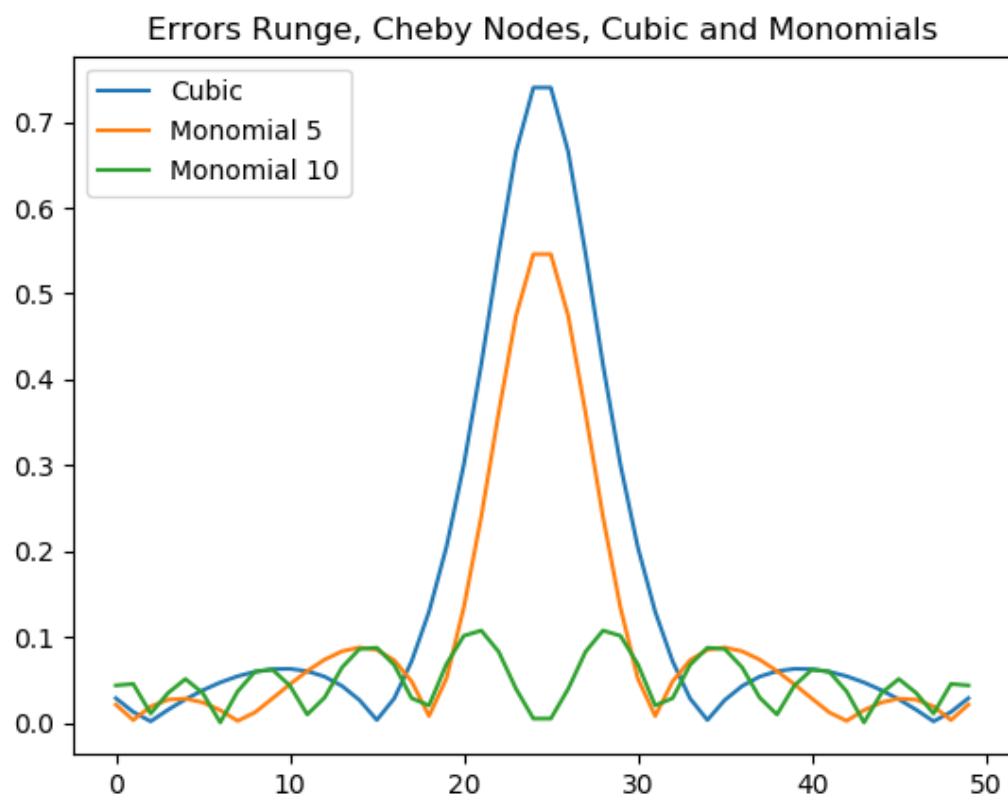Figure 11: Runge: Approximation using Cheby nodes and monomials

Figure 12: Runge: Errors of approximation using Cheby nodes and monomials
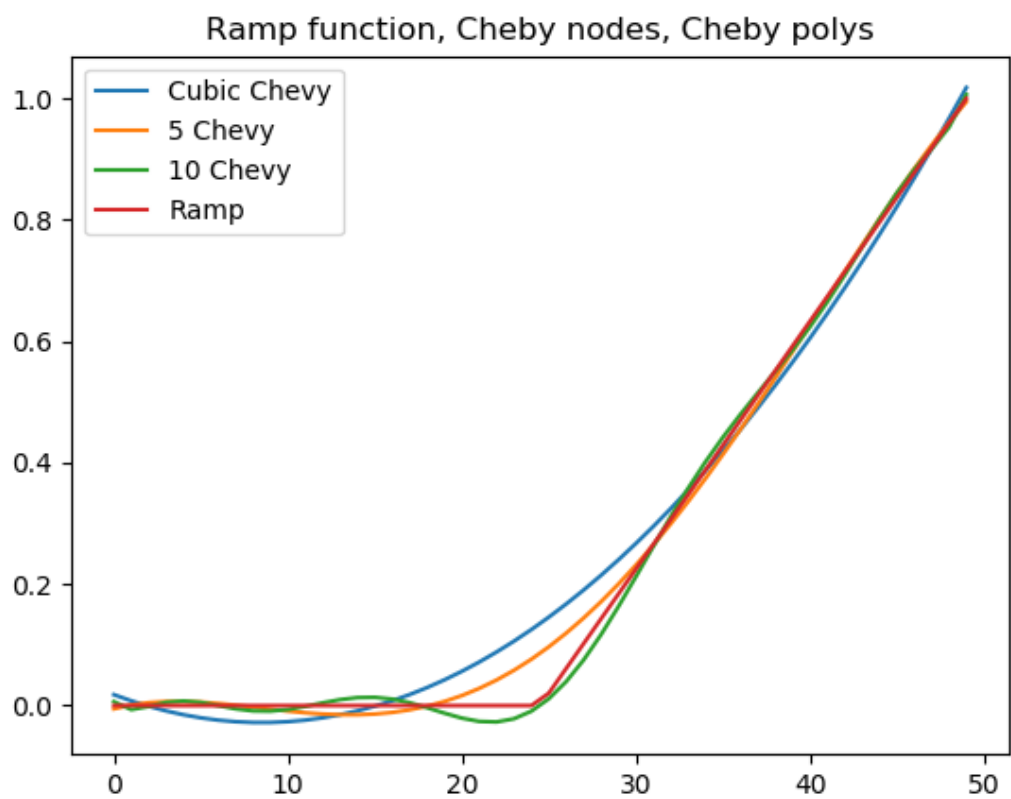
Figure 13: Ramp: Approximation using Cheby nodes and Cheby polynomials
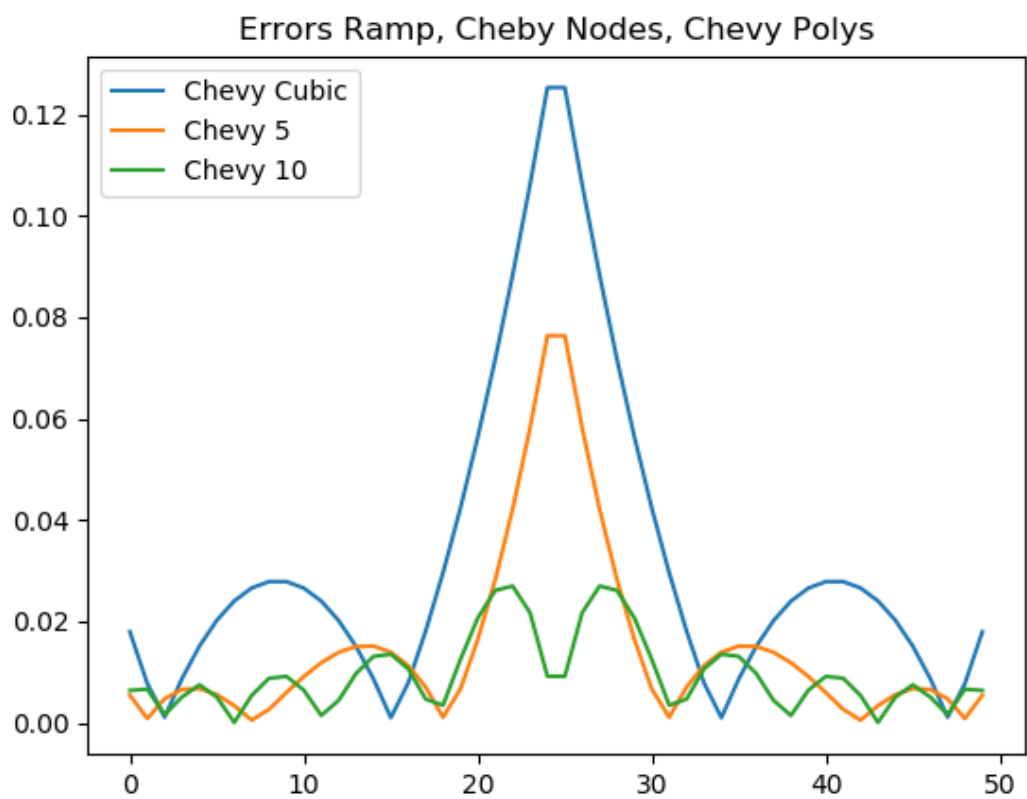
Figure 14: Ramp: Errors of approximation using Cheby nodes and Cheby polynomials
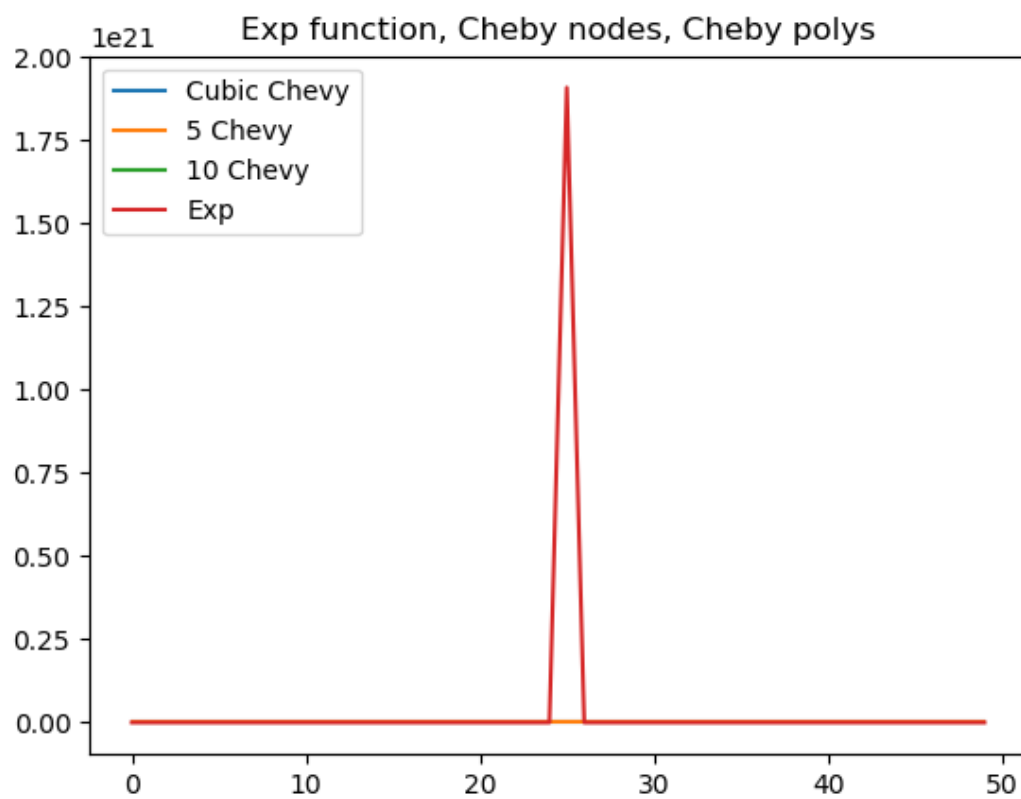
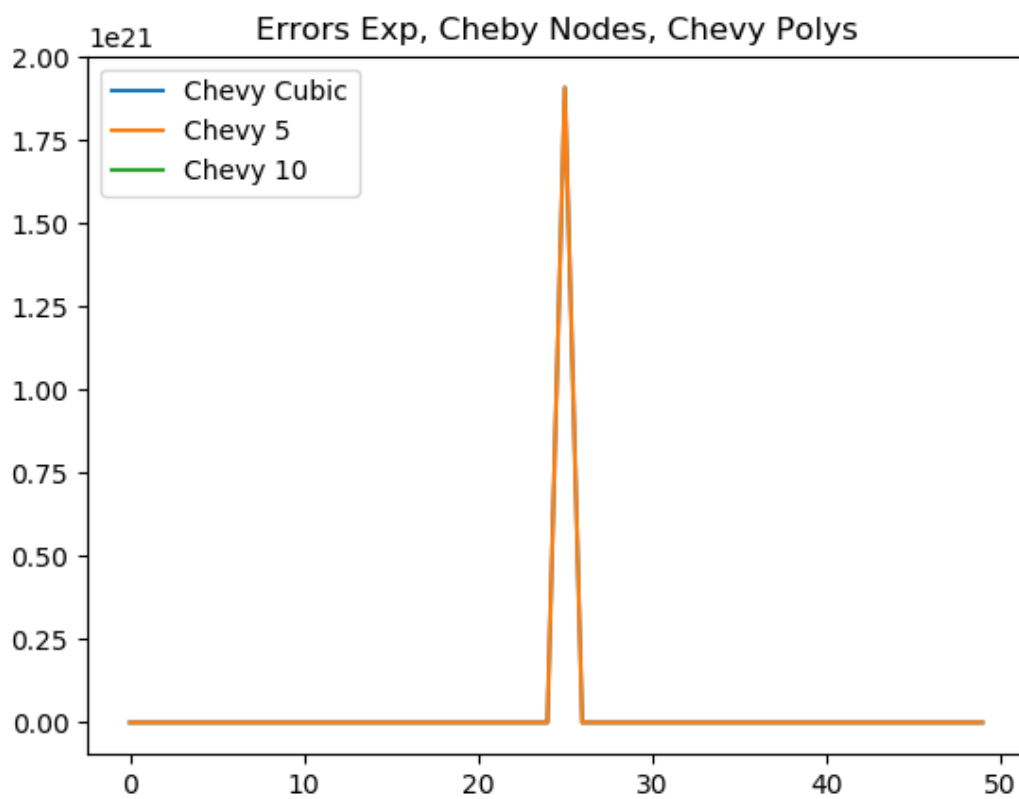Figure 15: Exp: Approximation using Cheby nodes and Cheby polynomials

Figure 16: Exp: Errors of approximation using Cheby nodes and Cheby polynomials
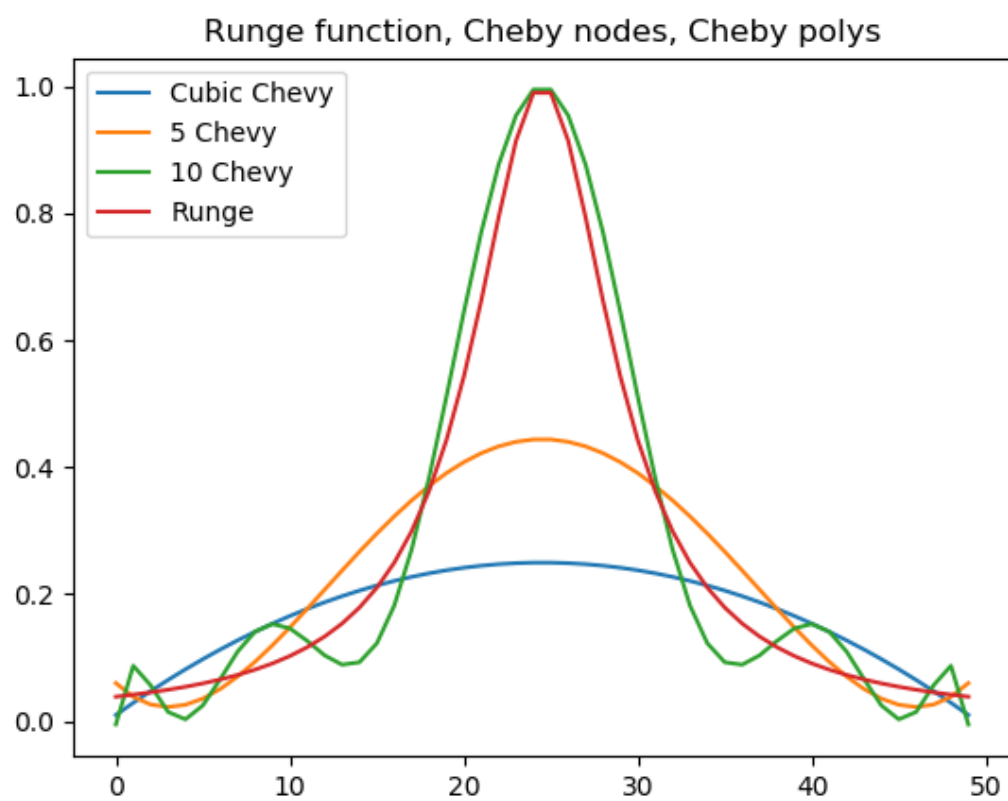
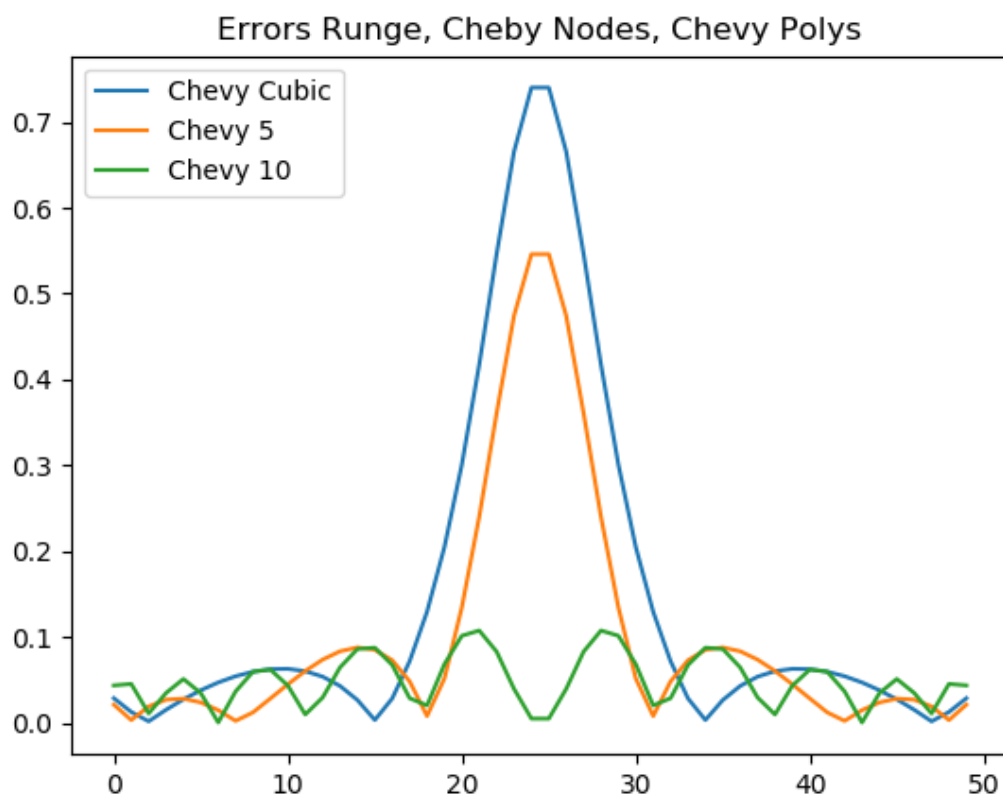Figure 17: Runge: Approximation using Cheby nodes and Cheby polynomials

Figure 18: Runge: Errors of approximation using Cheby nodes and Cheby polynomials