

A line plot showing the absolute error of various approximation methods for the function  $f(x) = \cos(x)$  on the interval  $[-3, 3]$ . The x-axis ranges from -3 to 3, and the y-axis ranges from 0 to 0.0001. The plot compares the absolute error of Taylor series (original, optimized degree 7, optimized degree 11, optimized degree 15) and Chebyshev series (degree 7, degree 11, degree 15). The Chebyshev degree 15 series shows the lowest error, followed by Taylor optimized degree 15, Chebyshev degree 11, Taylor optimized degree 11, Chebyshev degree 7, Taylor optimized degree 7, and the original Taylor series.

Approximation Method	Approximate Maximum Absolute Error
Absolute Error of Taylor original	0.00009
Absolute Error of Taylor optimized degree 7	0.00004
Absolute Error of Chebyshev degree 7	0.00003
Absolute Error of Taylor optimized degree 11	0.000015
Absolute Error of Chebyshev degree 11	0.00001
Absolute Error of Taylor optimized degree 15	0.000005
Absolute Error of Chebyshev degree 15	0.000002

