

Computing Modified Lagrange Interpolant

Compute the interpolating polynomial $P(x)$ through the data

x	0	$1/3$	$2/3$	1
$f(x)$	0	0.866	-0.866	0

using the Modified Lagrange interpolating formula.

Optional 1: Repeat the above, but using the Barycentric interpolating formula

Optional 2: Imagine someone now gives you the additional data point $(0.25, 1)$. Using either formula, update your interpolant. Try to minimize the extra work required for this update.

Newton's Method

Use Newton's method to approximate a root of $P(x)$ from the first question, using $x_0 = 1/3$. Do enough iterations such that $|x_n - x_{n-1}| < 10^{-2}$.

Optional: As a comparison, how many iterations of bisection or secant method would be needed to ensure a tolerance of 10^{-2} , using suitable starting conditions?