Examples of Numerical Errors

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Document created automatically by program `run_numerical_errors`

Contents

Function $f(x) = x^{10} + 1 - x^{10}$

Polynomial $p(x) = (x - 1)^6$

Numerical Derivative

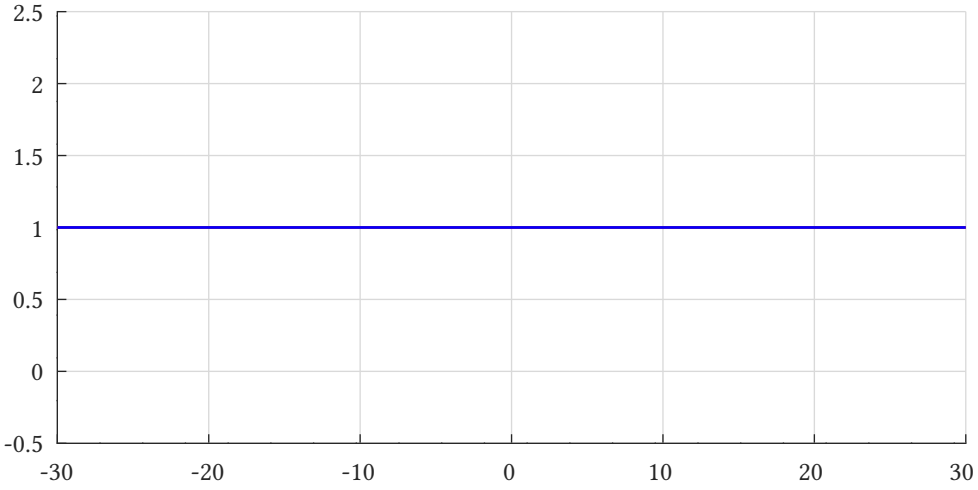
Function $f(x) = x^{10} + 1 - x^{10}$

Ploting function

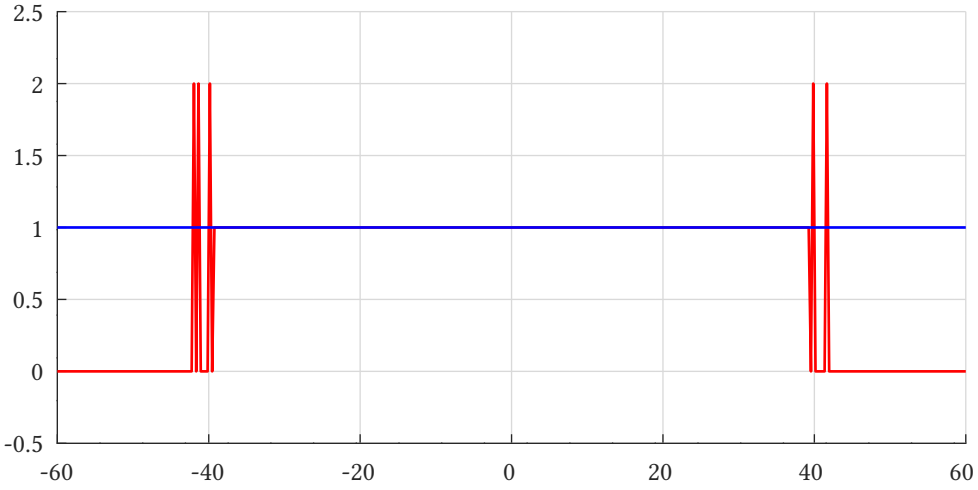
$$f(x) = x^{10} + 1 - x^{10}$$

on diferent intervals

Function $f(x) = x^{10} + 1 - x^{10}$



Function $f(x) = x^{10} + 1 - x^{10}$



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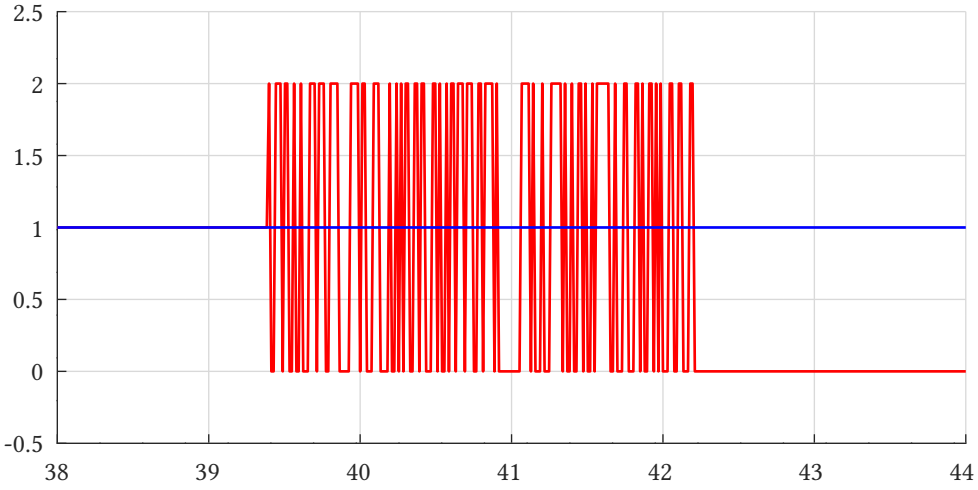

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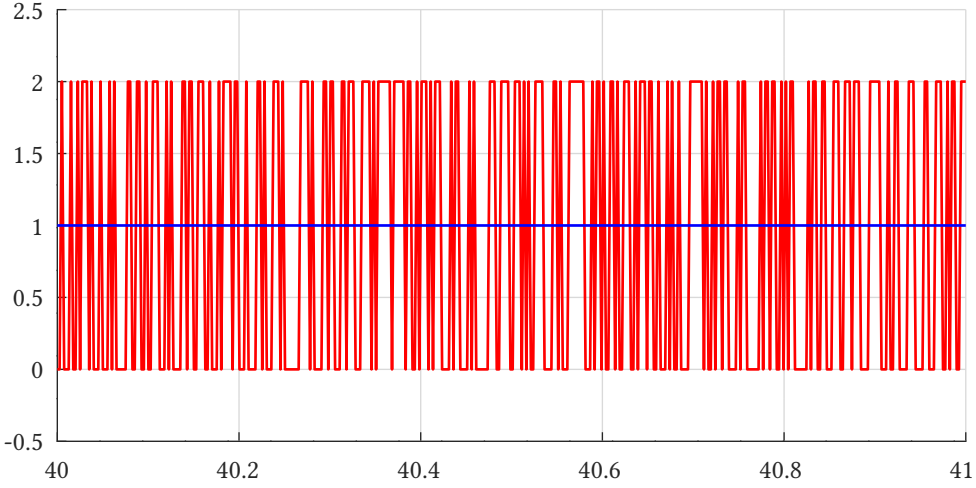

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Numerical Derivative

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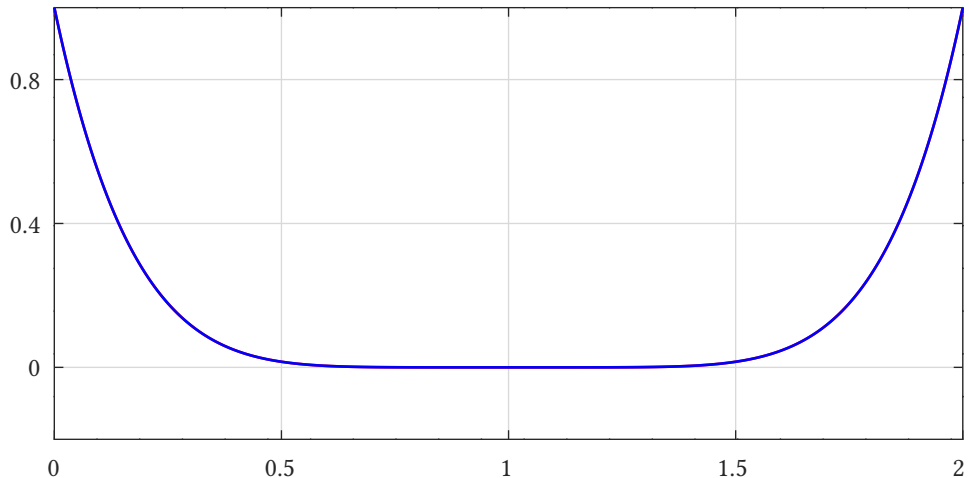
Ploting polynomials

$$p(x) = (x-1)^6$$

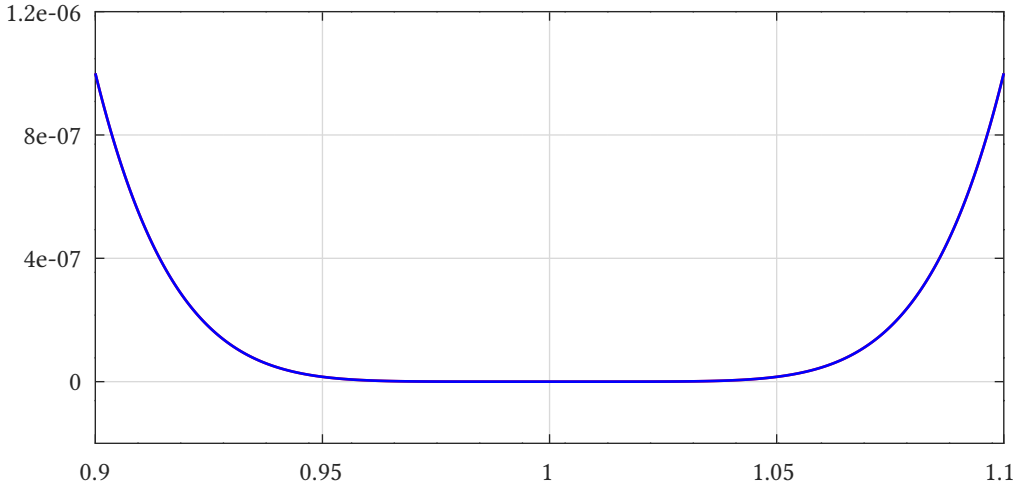
$$q(x) = x^6 - 6x^5 + 15x^4 - 20x^3 + 15x^2 - 6x + 1$$

on diferent intervals

Polynomial $p(x) = (x-1)^6$



Polynomial $p(x) = (x-1)^6$



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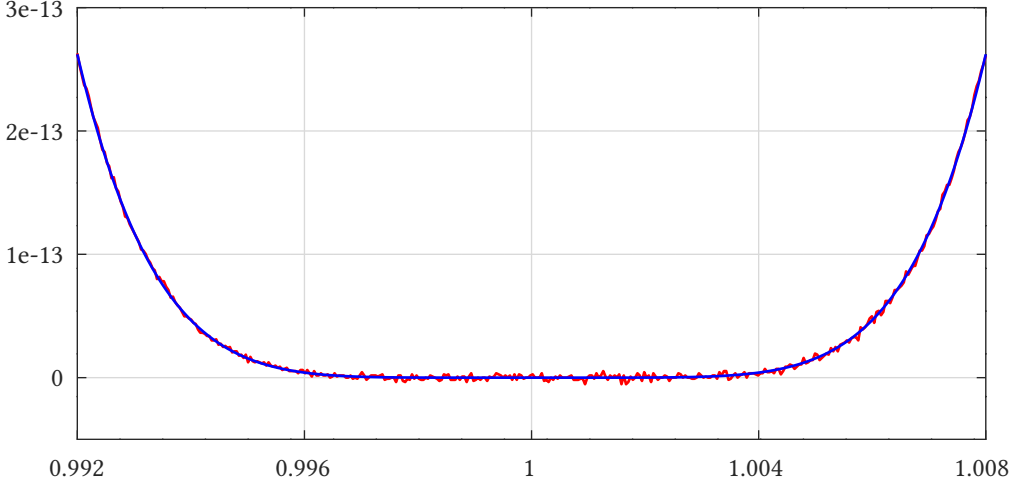

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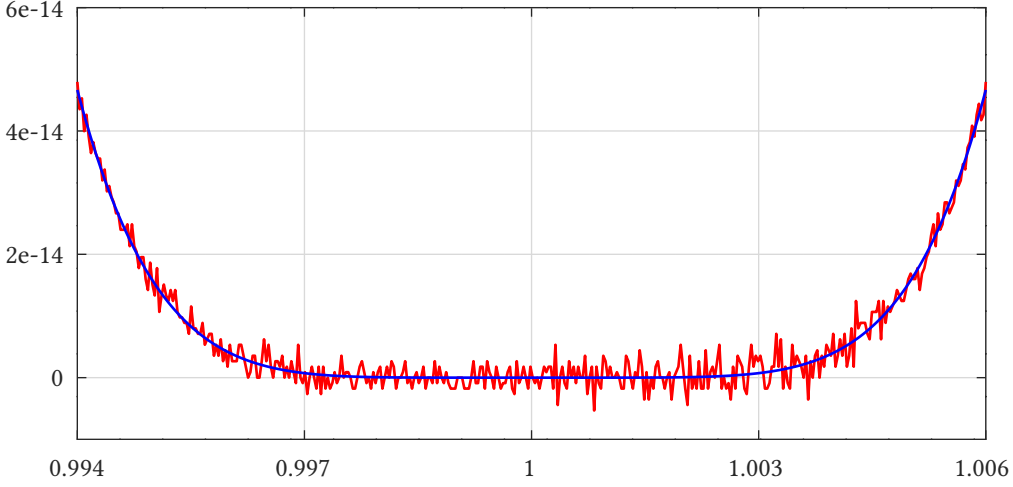

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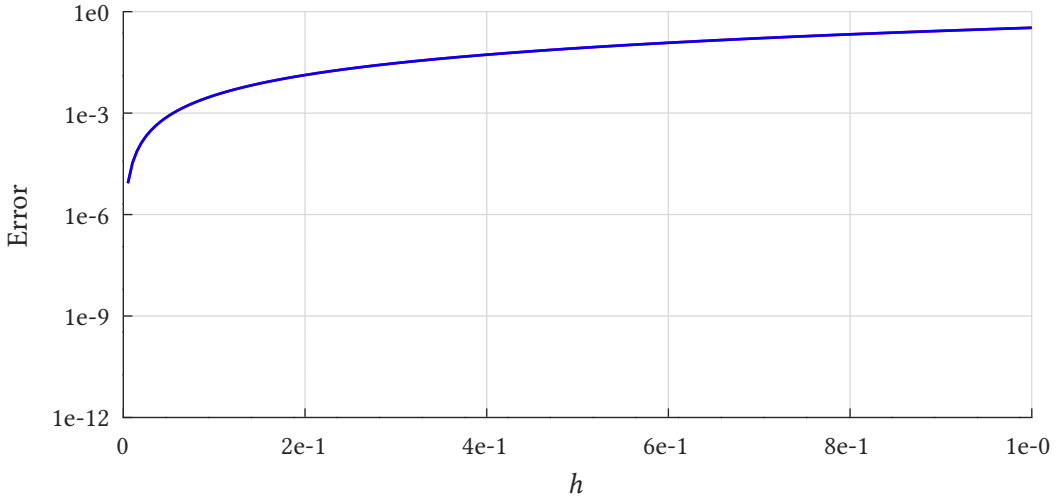
$$f(x) = \frac{x^3}{3} - 3x + 3 \qquad f'(x) = x^2 - 3$$

$$D_f(x, h) = \frac{f(x+h) - f(x-h)}{2h}$$

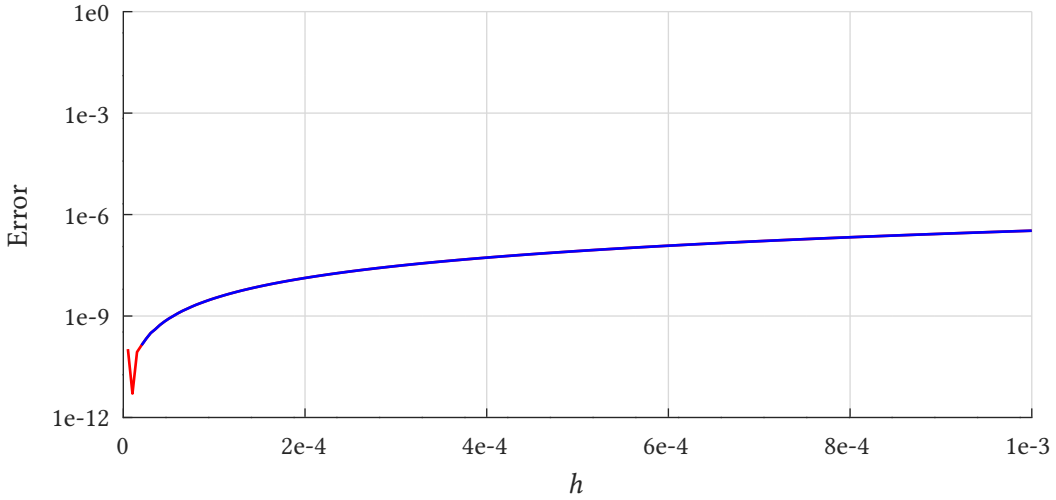
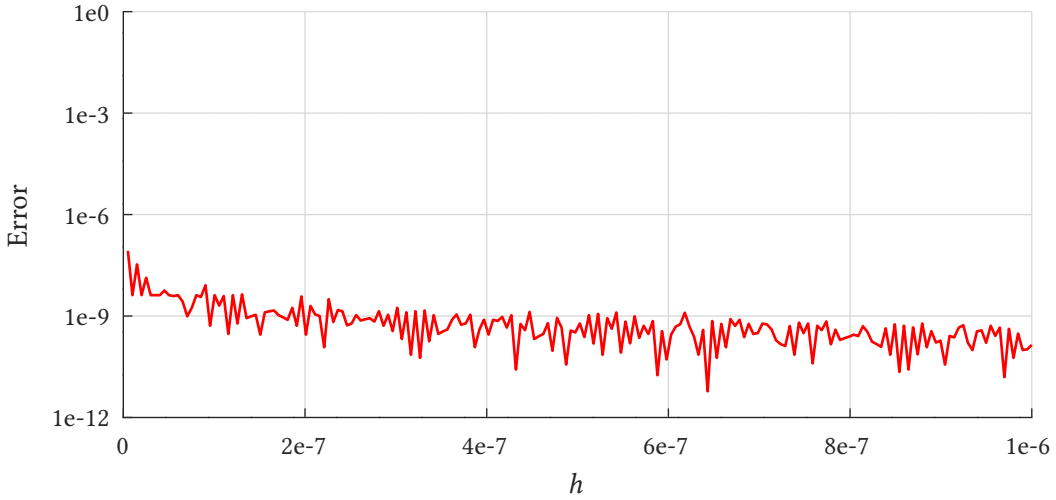
$$\text{Error}(h) = \left| f'(1) - D_f(1, h) \right|$$

$$x = 2 \qquad f'(2) = 1$$

Numerical Derivative $h \in [0, 10^{-0}]$



Numerical Derivative $h \in [0, 10^{-3}]$



Numerical Derivative $h \in [0, 10^{-6}]$